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CETIS: Complex Effluents Toxicity Information System. Data Encoding Guidelines and Procedures

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16. ABSTRACT

The computerized Complex Effluent Toxicity Information System (CETIS) data base includes data extracted from aquatic bioassay reprints as well as facility and receiving water information. Data references are obtained from both published papers and from unpublished results of tests conducted by state or regional environmental offices. Procedures for extracting and recording data based on the CETIS data element guidelines are discussed in detail.

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CETIS: Complex Effluents Toxicity Information System

Data Encoding Guidelines and Procedures

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CETIS: COMPLEX EFFLUENTS TOXICITY INFORMATION SYSTEM

DATA ENCODING GUIDELINES AND PROCEDURES

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TABLE OF CONTENTS

	Page
LIST OF FIGURES	vi
LIST OF TABLES	vii
ACKNOWLEDGMENTS	viii
INTRODUCTION	1
PROJECT DESCRIPTION	1
DATA ACQUISITION	1
DATA ENCODING AND QUALITY ASSURANCE	1
DATA RETRIEVAL	5
DATA ENCODING INSTRUCTIONS	9
GENERAL INSTRUCTIONS	9
FACILITY INFORMATION	10
Reference Number	10
NPDES Number	11
Indirect Source/Indirect Source Number	11
Indirect Discharger Facility Name or Type	11
Direct Discharger Facility Name or Type	11
Direct Discharger Location	11
Address	11
City	11
County	11
State	11
Zip Code or Country	11
Facility SIC Code	11
EFFLUENT/RECEIVING WATER INFORMATION	11
Direct Discharger Pipe Number	11
Indirect Discharger Pipe Number	11
Effluent Treatment Type	12
Disposal	12
Discharge Type	12
Discharge SIC Codes	12
Receiving Water Name	12
Major/Minor Basin	12
Reach Number	12
Mean Annual Flow	13
Q7-10 Low Flow	13

	Page
REVIEWER NAME/CODING DATE INFORMATION	13
Reviewer Name	13
Coding Date	13
TEST DATA INFORMATION	13
Test Number	13
SAMPLING INFORMATION	13
Collection Date/Time	13
Sample Type	13
Location	13
Waste Type	13
Daily Average Flow at Sampling Time	14
TOXICITY TEST INFORMATION	14
Test Date/Time	14
Testing Organization	14
Exposure Type	14
Residue Analysis	14
Bioassay Type - 1	14
Bioassay Type - 2	14
TEST WATER INFORMATION	14
Test Water Chemical Data	14
OTHER WATER PROFILE INFORMATION	15
Other Chemical Data	15
TEST ORGANISM INFORMATION	15
Test Species	15
Lifestage	15
Age	15
Weight	16
Length	16
Source	16
Acclimation Time	16
DILUTION WATER INFORMATION	16
Dilution Water Source	16
Dilution Water Pretreatment	16

	Page
TEST METHOD INFORMATION	17
Control Quality	17
Statistical Method	17
Data Quality Code	18
TEST RESULT INFORMATION	19
Test Duration	19
Concentration	19
Effect Endpoint	19
Effect	19

APPENDICES

A. GLOSSARY	A-1
B. STANDARD ABBREVIATIONS FOR USE IN REMARKS	B-1
C. STATE AND COUNTY CODES	C-1
D. SIC CODES	D-1
E. EFFLUENT TREATMENT PROCESSES	E-1
F. STANDARD ABBREVIATIONS USED FOR RECEIVING WATER NAMES	F-1
G. MAJOR/MINOR BASIN CODES	G-1
H. SAMPLE DATA SHEETS AND CODING FORMS	H-1
I. COMMON WATER AND WASTEWATER CONSTITUENTS	I-1
J. SPECIES CODES	J-1
K. PUBLISHED METHODS FOR CONDUCTING EFFLUENT BIOASSAYS	K-1

LIST OF FIGURES

		Page
Figure 1.	Data Record Forms	2
Figure 2.	CETIS Files at ERL-D	4
Figure 3.	IHS CETIS Data Base at NCC	6

LIST OF TABLES

		Page
Table 1.	Example of Cross-Referenced Data Elements	7
Table 2.	CETIS Report Specifications Summary	8

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INTRODUCTION

PROJECT DESCRIPTION

A computerized Complex Effluent Toxicity Information System (CETIS) data base has been developed to assemble the results of effluent toxicity tests so that toxicity characteristics of complex effluents can be determined on an industry-by-industry basis. The information is available through the National Computer Center (NCC) to state or regional environmental offices to assist them in determining where to use toxicity testing, in interpreting the results, and in setting discharge limits. In the future, additional state and regional environmental offices will be encouraged to encode and enter their data directly into the CETIS data base. This data base was designed collaboratively by the Environmental Research Laboratory-Duluth (ERL-D) (Office of Research and Development) and the Permits Division (Office of Water).

DATA ACQUISITION

Only bioassays conducted on fish, aquatic plants, and aquatic life-stages of macroinvertebrates are included in CETIS. Data references are obtained from both published papers and from unpublished results of tests conducted by state or regional environmental offices. Published papers are acquired primarily through a citation service and the Aquatic Information Retrieval Toxicity data base. Additional citations are extracted from review paper bibliographies; the University of Wyoming has supplied the CETIS Coordinator with synfuel toxicity bibliographies. Unpublished reports are obtained voluntarily from state and regional environmental offices.

DATA ENCODING AND QUALITY ASSURANCE

These data are evaluated by trained reviewers, and selected information is encoded onto data record forms (see Figure 1). A reviewers initial data record forms are thoroughly re-reviewed until the coding consistently reflects the guidelines and procedures outlined in this document. Thereafter, ten percent of the references encoded by each reviewer are re-reviewed by the CETIS Coordinator or another trained reviewer. Any differences are noted and discussed. Errors, if any, are identified and corrected. Discrepancies due to differences in interpretation are resolved by the CETIS Coordinator; successive errors incurred by an individual reviewer are dealt with by either retraining or terminating the reviewer if warranted.

Procedures for extracting and recording data are discussed in detail beginning on page 9 of this document. Appendix A is a glossary of terms used in this manual.

Refer to Figure 2 for a flow chart illustrating the data encoding, entry, and quality assurance procedures for the CETIS files at ERL-D.

COMPLEX EFFLUENT TOXICITY INFORMATION SYSTEM

DATA RECORD FORM

1) Reference Number .....

2) NPDES Number of Direct Discharger (Receiving Facility)..

3) Indirect Source (Y/N) / Indirect Source Number .....

4) Indirect Facility Name .....

5) Direct Discharger Facility Name & Type .....
6) Address .....

City .....County.....

State or Province (2 char code) / Zip or Country ..

7) Direct Discharger Facility SIC Codes (5 4-digit codes)..

Indirect SIC Codes (2 4-digit codes).....

11) Direct Discharger NPDES Outfall Pipe Number .....
Indirect Discharger Pipe Number .....
12) Effluent Treatment (7 2-char. codes) .....
14) Disposal (Surface water, Mun/offsite, Other).....
15) Discharge Type (Process, Cooling, Both, Other) .....
Indirect Discharge Type .....
16) Discharge SIC Codes (5 4-digit codes) .....

17) Receiving Water Name .....
Receiving Water Major Basin / Minor Basin .....
18) Receiving Water Reach Number .....
19) Receiving Water Mean Annual Flow (cfs) / Low Flow (cfs)

Coder Name (last name, initials) / Coding Date YY/MM/DD

Figure 1. CETIS Data Record Forms

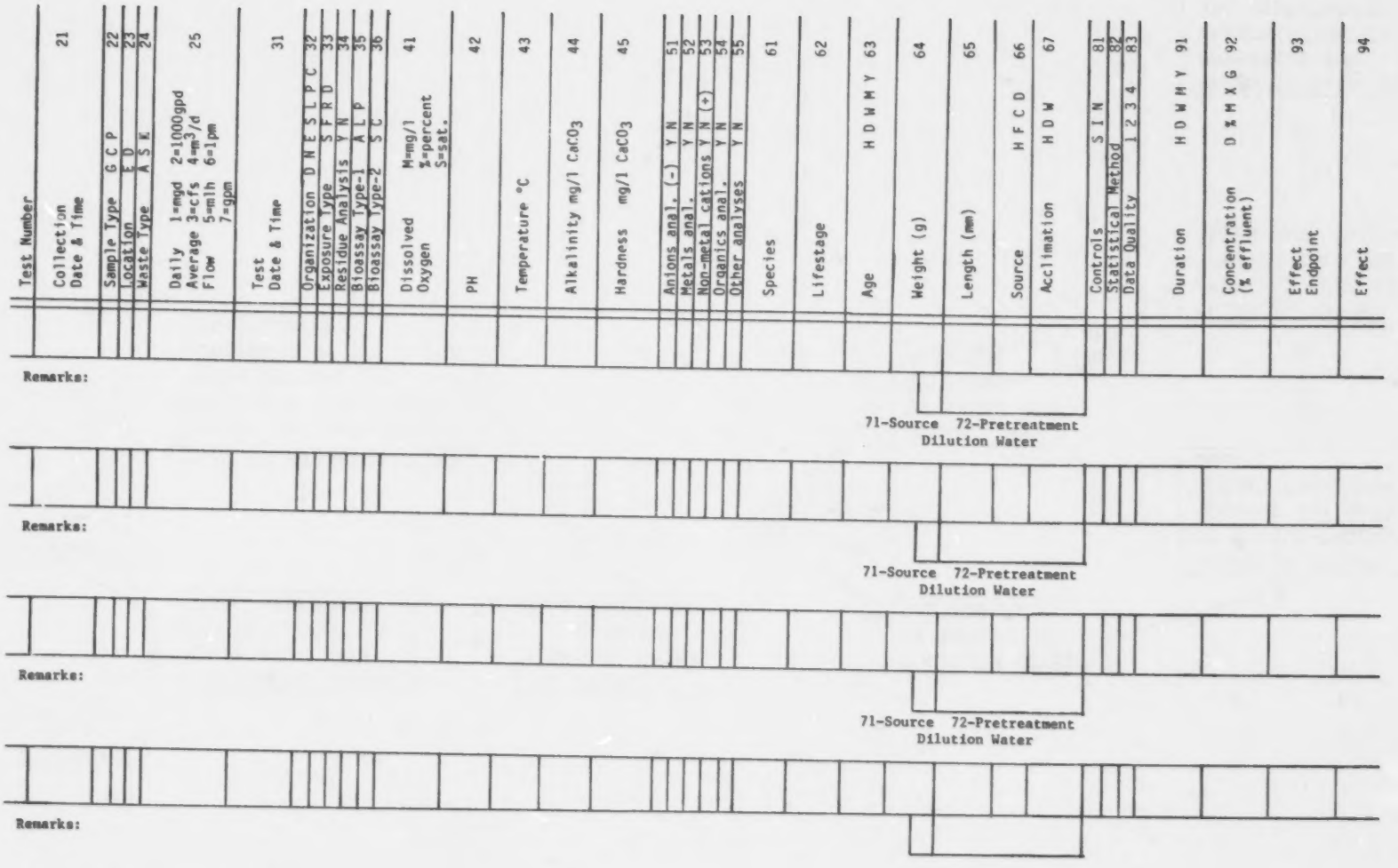
Test Number
Collection Date & Time 21
Sample Type G C P 22
Location E D 23
Waste Type A S K 24
Daily 1=mgd 2=1000gpd
Average 3=cfs 4=m3/d 25
Flow 5=mlh 6=lpm
7=gpm
Test Date & Time 31
Organization D N E S L P C 32
Exposure Type S F R D 33
Residue Analysis Y N 34
Bioassay Type-1 A L P 35
Bioassay Type-2 S C 36
Dissolved Oxygen M=mg/l %=percent S=sat. 41
PH 42
Temperature °C 43
Alkalinity mg/l CaCO3 44
Hardness mg/l CaCO3 45
Anions anal. (-) Y N 51
Metals anal. Y N 52
Non-metal cations Y N (+) 53
Organics anal. Y N 54
Other analyses Y N 55
Species 61
Lifestage 62
Age H D W M Y 63
Weight (g) 64
Length (mm) 65
Source H F C D 66
Acclimation H D W 67
Controls S I N 81
Statistical Method 82
Data Quality 1 2 3 4 83
Duration H D W M Y 91
Concentration (% effluent) D % M X G 92
Effect Endpoint 93
Effect 94
Remarks:
71-Source 72-Pretreatment
Dilution Water
Remarks:
71-Source 72-Pretreatment
Dilution Water
Remarks:
71-Source 72-Pretreatment
Dilution Water
Remarks:

Figure 1. Continued.

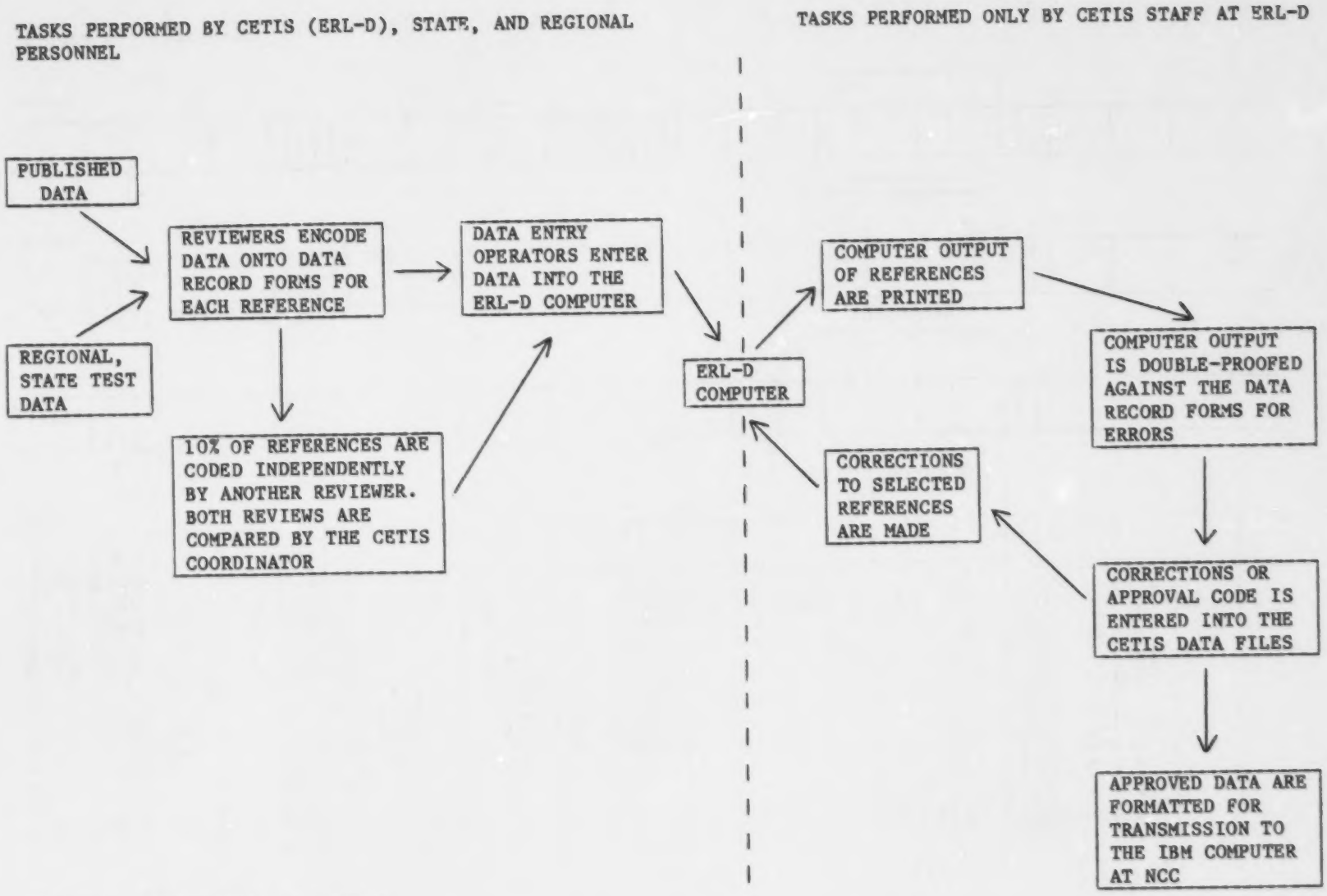
TASKS PERFORMED BY CETIS (ERL-D), STATE, AND REGIONAL PERSONNEL
TASKS PERFORMED ONLY BY CETIS STAFF AT ERL-D
PUBLISHED DATA
REGIONAL, STATE TEST DATA
REVIEWERS ENCODE DATA ONTO DATA RECORD FORMS FOR EACH REFERENCE
10% OF REFERENCES ARE CODED INDEPENDENTLY BY ANOTHER REVIEWER. BOTH REVIEWS ARE COMPARED BY THE CETIS COORDINATOR
DATA ENTRY OPERATORS ENTER DATA INTO THE ERL-D COMPUTER
ERL-D COMPUTER
COMPUTER OUTPUT OF REFERENCES ARE PRINTED
COMPUTER OUTPUT IS DOUBLE-PROOFED AGAINST THE DATA RECORD FORMS FOR ERRORS
CORRECTIONS OR APPROVAL CODE IS ENTERED INTO THE CETIS DATA FILES
CORRECTIONS TO SELECTED REFERENCES ARE MADE
APPROVED DATA ARE FORMATTED FOR TRANSMISSION TO THE IBM COMPUTER AT NCC

Figure 2. CETIS Files at ERL-D

Data from the data record forms are entered into data files on the ERL-D computer. Next, computer output of each new reference is printed at ERL-D. The CETIS data entry operator and reviewer both proof the computer output against the data record forms for possible errors. Next, the CETIS Coordinator marks an approval or corrections code on the computer output. Data are corrected, printed, and double-proofed if necessary.

In order to make CETIS accessible to users, approved data are formatted for transmission to the IBM computer system at NCC; this task is performed by the CETIS programmer at ERL-D. Figure 3 illustrates that incoming CETIS data are cross-referenced with corresponding data from the Industrial Facilities Discharge (IFD) file by using In-House Software (IHS). IFD is linked to the United States Geological Survey river gage level file, GAGE, by way of the hydrologic network file, REACH. Cross-referenced information from the IFD, REACH and GAGE files are stored in a temporary IHS file at NCC to allow quality assurance checks to be made by CETIS staff at ERL-D.

Next, hard copy reports of the cross-referenced data elements are printed along the full data listing for each reference (see Table 1). This information is proofed and edited by the CETIS reviewer prior to inclusion in the IHS CETIS data base. Any discrepancies between CETIS and IFD should be brought to the attention of the Section Chief of the Environmental Analysis Section of the Monitoring and Data Support Division of the Office of Water Regulations and Standards.

The IHS CETIS data base at NCC is updated periodically to reflect data updates in the IFD, REACH, and GAGE files.

DATA RETRIEVAL

The CETIS Retrieval System allows each user with an account at NCC to select the following template retrieval reports: 1) industry report, 2) receiving water or area report, 3) test report, 4) test species report, 5) effluent treatment report, and 6) total data listing report (see Table 2). The user can also design and implement specific retrievals to obtain data from CETIS and other IHS data files. Retrievals can be interfaced with the Statistical Analysis System (SAS) for analysis.

For additional information, the following CETIS Retrieval System documentation may be purchased from the National Technical Information Service (U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22151):

Gueldner, D. R., A. Pilli, J. L. Crane, and D. J. Sivertson. 1984. CETIS: Complex Effluents Toxicity Information System. CETIS Retrieval System User's Manual. EPA Report, Environmental Research Laboratory, U.S. Environmental Protection Agency, Duluth, MN: 12 p.

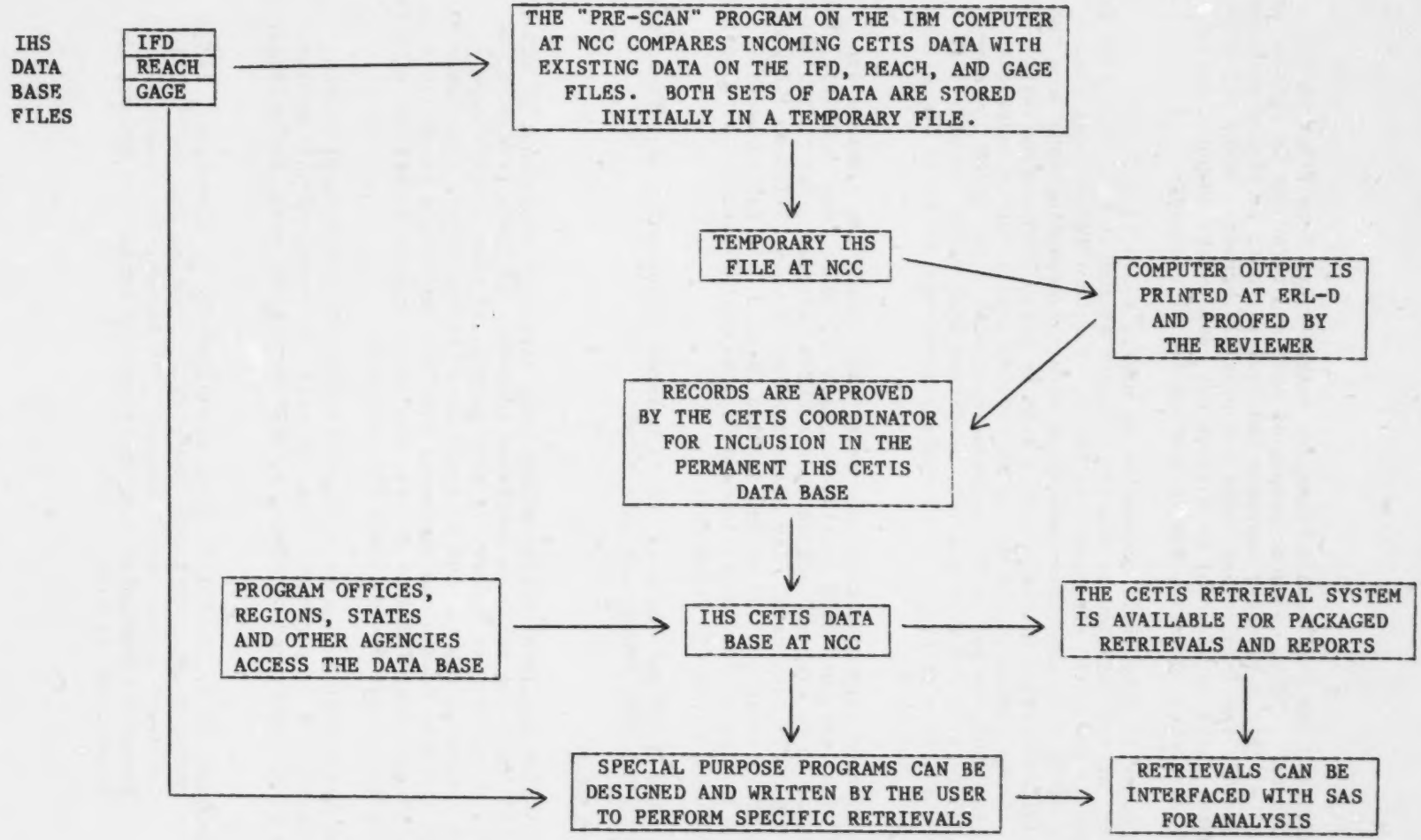
IHS DATA BASE FILES
IFD
REACH
GAGE
THE "PRE-SCAN" PROGRAM ON THE IBM COMPUTER AT NCC COMPARES INCOMING CETIS DATA WITH EXISTING DATA ON THE IFD, REACH, AND GAGE FILES. BOTH SETS OF DATA ARE STORED INITIALLY IN A TEMPORARY FILE.
TEMPORARY IHS FILE AT NCC
COMPUTER OUTPUT IS PRINTED AT ERL-D AND PROOFED BY THE REVIEWER
RECORDS ARE APPROVED BY THE CETIS COORDINATOR FOR INCLUSION IN THE PERMANENT IHS CETIS DATA BASE
PROGRAM OFFICES, REGIONS, STATES AND OTHER AGENCIES ACCESS THE DATA BASE
IHS CETIS DATA BASE AT NCC
THE CETIS RETRIEVAL SYSTEM IS AVAILABLE FOR PACKAGED RETRIEVALS AND REPORTS
SPECIAL PURPOSE PROGRAMS CAN BE DESIGNED AND WRITTEN BY THE USER TO PERFORM SPECIFIC RETRIEVALS
RETRIEVALS CAN BE INTERFACED WITH SAS FOR ANALYSIS

Figure 3. IHS CETIS Data Base at NCC

Table 1. Example of Cross-Referenced Data Elements

		********** DATA ENTERED AND CONVERSIONS **********	DATA FROM IFD, REACH, AND GAGE *******
01)	REFERENCE NUMBER:	ALED00008000	
**	FACILITY DATA **		
02)	NPDES NO:	AL0002763	AL0002763
03)	INDIRECT:	N IND. SOURCE NO: Z	?
04)	IND. FACILITY NAME:	Z	?
05)	FACILITY NAME:	ALABAMA FEED PRODUCTS (POULTRY BY-PRODUCTS)	POULTRY BY PROD HANCEVILLE
	ADDRESS:	OFF CULLMAN COUNTY ROAD 5	OFF CULLMAN CO RD 5
	CITY:	HANCEVILLE	
	COUNTY, STATE, ZIP:	43 AL 35077	43 AL 35077
06)	FACILITY SIC CODES:	2048 -1 -1 -1 -1	2048 2048 -1 -1 -1
	IND. DISCHARGE SIC CODES:	-1 -1	-1 -1
**	PIPE DATA **		
11)	NPDES PIPE NO:	1	1 IFD PIPE NO: 1
	IND. DISCHARGER PIPE #:	-1	-1
12)	EFFLUENT TREATMENTS:	U U U U U U U	
13)	DISPOSAL CODE:	U	S
**)	DISCHARGE HIT FLAG:		Y
14)	DISCHARGE TYPE:	U	P
	INDIRECT DISCHARGE TYPE:	Z	?
15)	DISCHARGE SIC CODES:	-1 -1 -1 -1 -1	2048 -1 -1 -1 -1
**)	DISCHARGE FLOW:		3.610E+02 PRECISION: R
**	RECEIVING WATER **		
16)	RECEIVING WATER NAME:	MULBERRY FORK	MULBERRY F
	MAJOR/MINOR BASIN:	3/39	3/39
17)	REACH NUMBER:	-1 -1	3160109 7 0
18)	MEAN ANNUAL FLOW (CFS):	-1.000	6.641E+02
	Q7-10 LOW FLOW (CFS):	-1.000	4.913E+00 NO. OF GAGES ON REACH: 2

Table 2. CETIS Report Specifications Summary

REPORT OPTIONS	SELECT OPTIONS	SORT OPTIONS	FORM.. OPTIONS
Industry Report	Industrial Category SIC Codes	SIC Codes & State State & SIC Codes	Brief Format Expanded Format SAS Format Disk File
Area or Receiving Water Report	Eight-digit Catalog Unit Eight-digit Catalog Unit & three-digit Segment Number Basin Code State	Catalog Unit & Segment Number NPDES Number	Brief Format Expanded Format SAS Format Disk File
Test Report	Bioassay Type 1 Bioassay Type 2 Exposure Type Test Duration	NPDES Number SIC Code	Brief Format Expanded Format SAS Format Disk File
Test Species Report	Test Species Lifestage	NPDES Number SIC Code	Brief Format Expanded Format SAS Format Disk File
Effluent Treatment Report	NPDES Number SIC Code Effluent Treatment*	NPDES Number SIC Code Low Flow Discharge Flow	Brief Format Expanded Format SAS Format Disk File
Total Data Listing Report	Reference Number* NPDES Number* Catalog Unit and Segment Number*	Not applicable	Full Data Listing Format

* Available after October, 1984.

DATA ENCODING INSTRUCTIONS

GENERAL INSTRUCTIONS

Data are encoded onto the CETIS data record forms according to the instructions given in these guidelines. The data record form consists of data elements unique to CETIS in addition to data elements obtained from EPA's IFD, REACH, and GAGE files. Elements from these files include information about the facility, effluent, and receiving water; these elements are indicated with an asterisk on the following pages.

In order to facilitate coding, an IFD list of direct and indirect discharger facilities, by state, is available from the CETIS Coordinator. This list includes data from the following categories: facility name (direct or indirect discharger, NPDES number, indirect source number, pipe number (direct or indirect discharger), SIC code(s) (direct or indirect discharger), direct discharger location (i.e., address, city, county, state, and zip code), receiving water name, and major/minor basin codes. Refer to this list when coding to assist in properly identifying the facility and related information since data sheets are often incomplete.

Data elements which are cross-referenced from IFD, REACH, and GAGE will be incorporated into the CETIS data base. A few data elements are only obtained from these data files. They include the facility discharge flow (1000 gpd), the discharge hit flag (indicates whether the discharge flows directly into the segment recorded from the REACH file), and the number of gages on each REACH segment.

If a facility is not available from the IFD list and sufficient information is given in the bioassay report, use the State, SIC Code, and Basin Code Appendices C, D, and G, respectively, to assign the relevant codes.

Always record the information given in the bioassay report and the corresponding IFD list on the data record form. Much of this information will also be supplied when the CETIS file is cross-referenced with the IFD, REACH and GAGE files. The original coded information is used as a quality assurance check for the cross-referenced IFD information. The cross-referenced IFD, REACH, and GAGE elements are used for the IHS CETIS data base and without the cross-checking described above, would miss the CETIS quality assurance procedures described in Figures 2 and 3.

Do not leave any blanks on the coding forms. In alphabetic fields, indicate unavailable or unreported information with a U and use a Z if the information is not applicable; in numeric fields, both of these are indicated by a -1.

Use ditto marks on the data record forms to indicate duplicate information between successive tests. If additional pages are used, all coded information must be written out on the top line of each page for data entry purposes.

The following general categories have been established for grouping the CETIS data elements:

00 - Facility Information
10 - Effluent/Receiving Water Information
 - - Reviewer Name/Coding Date Information
20 - Sampling Information
30 - Toxicity Test Information
40 - Test Water Information
50 - Other Water Profile Information
60 - Test Organism Information
70 - Dilution Water Information
80 - Test Method Information
90 - Test Result Information

Specific remarks corresponding to the aforementioned categories and their data elements may be made. A unique three digit code consisting of the data element number followed by a third digit, allows several remarks to be made for the same data element. If the remark pertains to a general heading; e.g., 80) Test Methods, code the first remark as 800 and any additional remarks as 801, 802, etc. If the remark refers specifically to the control mortality (#81), code the first remark as 810 and any additional remarks as 811, 812, etc. Abbreviations to be used in the Remarks are listed in Appendix B.

Use the following codes for these common Remarks:

200/ sampler used//
300/ photoperiod time//
400/ aeration, salinity (report units as ppt instead of o/oo), carrier or solvent (in what amount)//
600/ fed or unfed (during test)//
800/ reference cited, also comment on deviations from cited methods//
900/ erratic mortality and/or stress//

If additional effects, lifestages, statistical methods, dilution water sources or dilution water pretreatments not included in these guidelines are encountered, request a new code for them from the CETIS Coordinator. The data base will be updated periodically to accommodate new codes. Further questions about the guidelines should be directed to the CETIS Coordinator at ERL-D.

00) FACILITY INFORMATION

1) Reference Number: The reference number consists of a 4-letter prefix assigned by ERL-D indicating the organization that is responsible for the coding, a 5-digit sequence assigned by the encoder identifying the number assigned to each report, and a 3-digit suffix assigned by the encoder to make it possible to have more than one reference from a single paper. Any change in data elements 2-6 requires a new reference number, and any change in data elements 11-19 requires a new 3-digit suffix.

Example:

M N	E D	0 0 0 1 5	0 0 0
State Code	Coded at ERL-D	Assigned Number	3-Digit Suffix

*2) NPDES Number: Enter the NPDES number of the direct discharge facility; this also corresponds to the receiving facility of an indirect discharger.

*3) Indirect Source/Indirect Source Number: Enter either yes (Y) or no (N) to indicate an indirect discharge facility. If yes, an Indirect Source Number must also be entered.

*4) Indirect Discharger Facility Name or Type: Enter the indirect discharge facility name (or facility type if the name is unknown).

*5) Direct Discharger Facility Name or Type: Enter the direct discharger facility name (or facility type if the name is unknown).

*6) Direct Discharger Location:

Address: Enter the street or mailing address.

City: Enter the city name.

County: Enter the numeric county code given in the STORET User's Handbook, second edition.

State: Enter the state postal abbreviation (see Appendix C). Substitute provinces for state abbreviations if applicable.

Zip Code or Country: Enter the zip code or country name if not within the United States.

*7) Facility SIC Codes: Enter up to five 4-digit codes identifying the type of direct or indirect discharge facility (see Appendix D).

10) EFFLUENT/RECEIVING WATER INFORMATION

*11) Direct Discharger Pipe Number: Enter the NPDES outfall number of the direct discharger/receiving facility.

Indirect Discharger Pipe Number: Enter the pipe number assigned by IFD for the indirect discharge facility.

---

* cross-referenced with IFD

12) Effluent Treatment Type: Enter up to 7 codes for treatment processes employed by the facility prior to effluent discharge (see Appendix E). Record, in Remarks, any comments regarding whether the treatment process was functioning or not at the time of sampling.

*14) Disposal: Enter the disposal code for the direct discharger.

S = facility discharges to surface water (e.g., stream, lake, reservoir)

O = facility disposes of its waste in some other manner (e.g., evaporation lagoon or pond, septic tank, underground well)

*15) Discharge Type: Enter the code describing the flow type for the direct and indirect dischargers. If more than one code applies to the discharge type, choose the one with the greatest proportion leaving the pipe. Record the other discharge type(s) in the Remarks.

C = non-contact cooling water

P = process water (e.g., ship ballast water, mine drainage, wash-down water, filter backwash, ash pond, transport water, or if the SIC code = 4952, sanitary waste)

B = both process with cooling water flow and/or other type flow (e.g., contact cooling water, boiler blowdown, cooling tower blowdown)

O = other (e.g., storm water runoff or if the SIC code $\neq$ 4952, sanitary waste)

*16) Discharge SIC Codes: Enter the SIC code(s) pertinent at the pipe level (e.g., the outfall may handle only one of several possible discharges for the facility) (see Appendix D).

*17) Receiving Water Name: Enter the receiving water name using the standard abbreviations in Appendix F. For purposes of uniformity, omit all periods and commas after the standard abbreviations.

Major/Minor Basin: Enter the codes which identify the major and minor basins.

**18) Reach Number: Enter the 8-digit catalog unit and 3-digit segment number identifying the stream reach into which the facility discharges.

---

* cross-referenced with IFD
** cross-referenced with REACH

***19) Mean Annual Flow: Enter the most recent flow (in cfs) of the receiving stream.

Q7-10 Low Flow: Enter the 7 day - 10 year low flow (in cfs) of the receiving stream.

REVIEWER NAME/CODING DATE INFORMATION

Reviewer Name: Enter the reviewer's last name followed by the first and middle initials.

Coding Date: Record the date when the data record forms were encoded as YY/MM/DD.

TEST DATA INFORMATION

Test Number: Enter test numbers sequentially, starting with 1. Any change in sections 20-80 requires a new test number. If sections 20-80 remain constant, but section 90 changes (e.g., LC50s given at multiple durations for one bioassay), then keep the same test number; enter different information from section 90 on a new line and draw a line through sections 20-80 to indicate duplicate information (see coding sheet example, Appendix H).

20) SAMPLING INFORMATION

21) Collection Date/Time: Enter the date and time (24-hour clock) at which sampling began as YY/MM/DD and HHMM. In Remarks, record the end of sampling for composite or continuous samples as 210/to YY/MM/DD, HHMM//.

22) Sample Type: Enter the appropriate code.

C = continuous
G = grab
P = composite

23) Location: Enter the sampling location code.

D = different (identify further within Remarks)
E = end-of-treatment

24) Waste Type: Enter the appropriate code.

A = actual
K = spiked
S = synthetic

*** cross-referenced with GAGE

25) Daily Average Flow at Sampling Time: Enter the flow from the discharge pipe at the time of sampling with the appropriate flow units code.

1 = mgd	5 = 10^6 l/hr
2 = 1000 gpd	6 = l/min
3 = cfs	7 = gal/min
4 = m^3/d	

30) TOXICITY TEST INFORMATION

31) Test Date/Time: Enter the date and time (24-hour clock) at which the bioassay began as YY/MM/DD and HHMM. In Remarks, record the end of testing as 310/to YY/MM/DD, HHMM//.

32) Testing Organization: Enter the appropriate code.

C = college or university	L = local	S = state
D = different	N = national	
E = U.S. EPA	P = private	

33) Exposure Type: Enter the appropriate code.

D = diet	R = renewal
F = flow-through	S = static

34) Residue Analysis: This data element specifies whether test organism tissue analysis was conducted to indicate the toxicant and/or its concentration. Enter Y for yes or N for no.

35) Bioassay Type - 1: Enter the appropriate code.

A = acute	P = partial life cycle
L = life cycle	

36) Bioassay Type - 2: Enter the appropriate code.

C = complete	S = screen

40) TEST WATER INFORMATION

41-45) Test Water Chemical Data: Enter the mean value if reported. Enter the low-to-high concentration ranges for the following test water measurements (i.e., analyses performed on water samples taken from the test containers during the time the bioassay was run): dissolved oxygen (mg/l, % saturation (%), or saturation (S)), pH (standard units), temperature (°C), alkalinity (mg/l $CaCO_3$), and hardness (mg/l $CaCO_3$). The range includes any duplication/replications of the dilution series concentrations.

A qualifier symbol is allowed in the dissolved oxygen fields. For other test water measurements, qualifiers must be indicated in the Remarks.

Test chemical data are reported only for the length of time reported in data element 91 (i.e., test duration). For screening tests, report the test water chemistry values as a range for the 0% and 100% effluent concentrations for the duration reported.

If the test water chemistry is not available, it is acceptable to encode values obtained from the field collected effluent and/or diluent as long as these sources are indicated in the Remarks. However, field determined temperature values are not included in CETIS since temperature varies widely from field to laboratory conditions.

Record salinity information as a 400 Remark.

50) OTHER WATER PROFILE INFORMATION

51-55) Other Chemical Data: Enter Y for yes or N for no to indicate whether analyses on the test water, effluent, and/or diluent were run to determine anions, metals, nonmetal cations, organics, and other available analyses. State in the Remarks whether the test water, effluent, and/or diluent water profiles were given. Briefly identify, in Remarks, the other available analyses. Appendix I lists common water and wastewater constituents in categories as they are used for CETIS.

Total residual chlorine and conductivity test water values are specified in the other available analyses Remarks.

60) TEST ORGANISM INFORMATION

61) Test Species: Enter the appropriate species code listed in Appendix J. If the test species is not listed in Appendix J request a code from the CETIS Coordinator. Only bioassays conducted on fish, aquatic plants, and aquatic lifestages of macroinvertebrates are included in CETIS.

62) Lifestage: Enter the appropriate code.

ALEV - alevin	FRY - fry	YNG - young
ADLT - adult	INST - instars	YRLG - yearling
EGG - egg	JUV - juvenile	ZOEA - zoea, zoeal stages
EGGE - eyed egg	LARV - larval	
EGGF - fertilized egg	NEON - neonate	
EMBR - embryo	NYMP - nymph	
FING - fingerling	UNYR - underyearling	

63) Age: Enter the species age at the onset of testing. Enter the range if reported. A qualifier symbol (i.e., <,>) for the mean may be used. Enter the appropriate age units code.

D = days M = months Y = years
H = hours W = weeks

64) Weight: Enter the species weight in grams. Enter the range if reported; a qualifier symbol (i.e., <,>) for the mean may be used.

65) Length: Enter the species length in millimeters. Enter the range if reported; a qualifier symbol (i.e., <,>) for the mean may be used.

66) Source: Enter the appropriate code for the test species source.

C = cultured F = field-collected
D = different (describe further in Remarks) H = hatchery

67) Acclimation Time: Enter the time spent by the test organisms within the dilution water prior to testing. Report the acclimation time as zero (0) if no acclimation occurred. If acclimation is not discussed in the bioassay report, record the acclimation time as unknown (U). A qualifier symbol (i.e., <,>) may be entered in the mean field. Enter the appropriate acclimation units code.

D = days W = weeks
H = hours

70) DILUTION WATER INFORMATION

71) Dilution Water Source: Enter the appropriate code.

A = other
B = brackish
C = chlorinated tap
D = dechlorinated tap
G = spring
L = lake
M = marine, sea
P = pond
R = reconstituted
S = stream, river, brook
T = unchlorinated tap
W = well
X = distilled

72) Dilution Water Pretreatment: Enter the appropriate code. (Up to 4 pretreatments may be specified.)

1 = none
2 = pH adjustment
3 = hardness adjustment
4 = dissolved oxygen adjustment
5 = temperature adjustment
6 = salinity adjustment
7 = solids removal
8 = phosphate removal
9 = sulfate removal
10 = ammonia removal
11 = deionization (Cu, Pb, Zn, etc.)
12 = defluoridization
13 = dechlorination
14 = carbon filtered
15 = filtered
16 = de-supersaturated
17 = neutralized
18 = autoclaved
98 = not applicable
99 = unknown

80) TEST METHOD INFORMATION

81) Control Quality: Enter the appropriate code. In the Remarks, record the percent mortality incurred by the control organisms during the test duration reported in data element 91.

S = satisfactory, if less than or equal to 10 percent of the controls die/are affected or if the control mortality/effect is statistically accounted for by published methods.
N = not satisfactory, if more than 10 percent of the controls die/are affected and are not statistically accounted for or if no controls are used.
I = indeterminate, if insufficient information is provided for assessment.

82) Statistical Method: Enter the code for the statistical method used in determining the test result.

1 = Log-Concentration vs. Percent Survival[a]
2 = Litchfield-Wilcoxon[b]
3 = Probit[a]
4 = Logit[c]
5 = Moving-Average[d]
6 = Trimmed Spearman-Karber[e]
7 = Students T-test[f]
97 = unknown
98 = not applicable
99 = other

[a]Finney, D. J. 1971. Probit Analysis, 3rd ed. Cambridge Univ. Press, New York. 333 p.

[b]Litchfield, J. T. and F. Wilcoxon. 1949. A Simple Method of Evaluating Dose-Effect Experiments. Pharmacol. Exp. Ther. 96: 99.

[c]Berkson, J. 1953. A Statistically Precise and Relatively Simple Method of Estimating the Bioassay with Quantal Response Based on the Logistic Function. J. Amer. Statis. Assn. 48: 565.

[d]Thompson, W. R. 1947. Use of Moving Averages and Interpolation to Estimate Median-Effective Dose. I. Fundamental Formulas, Estimation of Error, and Relation to Other Methods. Bact. Rev. 11: 115-145.

[e]Hamilton, M. A., R. C. Russo, and R. V. Thurston. 1977. Trimmed Spearman-Karber Method for Estimating Median Lethal Concentrations in Toxicity Bioassays. Environ. Sci. Technol. 11(7): 714-719. Correction 12(4): 417 (1978).

[f]Steel, R. G. D. and J. H. Torrie. 1960. Principles and Procedures of Statistics. McGraw Hill Book Co., New York. 481 p.

83) Data Quality Code:

Assign the data quality code which identifies how thoroughly the experimental procedures and results were documented.

1 = Published papers (i.e., journal articles, EPA reports, and other agency reports) which meet the following criteria:

- Effluent was collected less than 24 hours prior to testing. The method of collection was reported. Experimental procedures followed published methods. (See Appendix K for bioassay methods publications).

- Standard test water chemistry data (i.e., D.O., pH, temperature, alkalinity, and hardness) were reported.

- Control mortality/effect was satisfactory (i.e., equal to or less than 10%).

- Statistical methodology used to determine the endpoint was reported.

2 = Published papers which contain satisfactory effluent collection methods and experimental procedures but:

- Standard test water chemistry data (i.e., D.O., pH, temperature, alkalinity, and hardness) were either partial or not reported.

- Control mortality/effect was not reported, was high (>10%) or was high but accounted for statistically.

- Statistical methodology used to determine the endpoint was not reported.

3 = Unpublished reports (e.g., state and Federal agency studies) which document experimental procedures and results.

4 = Data sheets which contain the raw test data and include minimal information about experimental procedures.

90) TEST RESULT INFORMATION

Statistically-derived effect endpoint (see data element 93) values are reported for each test duration. If no effect endpoint is calculated, a sublethal effect (see data element 94) is reported, and a description of the effect (e.g., percent mortality) is given in the Remarks. If mortality is the sublethal effect, record the earliest time and lowest concentration at which 100% mortality occurs. If 100% mortality does not occur, record the mortality at the end of the bioassay at the highest concentration tested. For other effects (e.g., abundance, behavior, and population growth), the percent change from the control or pretreatment at the lowest concentration and earliest time is reported along with the significance level (if calculated). If significant percent changes are not reported, report the effect as decreased, increased, or not affected in the 940 Remarks.

91) Test Duration: Enter the test duration. Express duration units either in hours (H), days (D), weeks (W), months (M), or years (Y) as reported.

92) Concentration: Enter the test endpoint concentration as either g/l (G), mg/l (M), µg/l (X), or % effluent (%). Different (D) concentration units such as µl/l are specified in the Remarks. Enter the range if reported, and specify in the Remarks if it is a confidence interval (e.g., 95% confidence interval). A qualifier symbol (i.e., <,>) may be entered for the mean.

93) Effect Endpoint: Enter the code which specifies the calculated effect endpoint.

EC50 - Median effective concentration at which an effect occurred to 50% of the test organisms within a given length of time.
EC50-AB - Abnormalities
EC50-GR - Growth
EC50-IM - Immobilization
EC50-RE - Reproduction
LC50 - Median concentration lethal to 50% of the test organisms within a given length of time.
LT50 - Median lethal time for 50% of the test organisms.

94) Effect: Enter the code which specifies the primary effect experienced by the test organisms during/after the bioassay.

ABD - Abundance: number of organisms of the same species has changed within a population
ABN - Abnormalities: physical deviations observed from normal control organisms
AVO - Avoidance: organism avoids or is attracted to certain effluent concentrations
BEH - Behavior: quantifiable change in activity which arose from exposure to internal or external stimuli

BIO - Biochemical Effect: physiochemical reactions (e.g., change in glycogen levels) occurring within the organism on a cellular level

CYT - Cytogenetic Effect: genetic mutation on a cellular level

DIS - Disease: impairment of vital functions observed as a result of effluent concentrations, specific infective agents, inherent organism defects, or a combination of these factors

ENZ - Enzyme Effect: deviations in enzyme activity

FCR - Food Consumption Rate: quantifiable change in rate of food consumed by test animal

GRO - Growth: measured increase of animal size in length and/or weight

HAT - Hatchability: percent hatch

HEM - Hematological Effect: changes in the blood parameters observed

HIS - Histological Effect: indicated by the presence of lesions or other damage to tissues (e.g., liver, kidney)

MOR - Mortality: percentage of dead organisms

MOT - Motility: change in locomotor behavior

OC - Oxygen Consumption: change in O_2 uptake in animals

PGR - Population Growth: increase or decrease in growth of an algal population (e.g., change in cell number)

POP - Population: change in the species composition or diversity

PSE - Photosynthesis Effect: change in plant productivity

RES - Respiratory Rate: change in respiratory rate of vertebrates, invertebrates

RSD - Residue: toxicant uptake by tissues of test organism

SS - Swimming Speed: change in swimming speed

STR - Stress: observed physiological tension in animals or plants

TMR - Tumor Occurrence: presence of a mass of abnormal tissue

Appendix A

GLOSSARY

FIPS - Federal Information Processing Standards

GAGE - United States Geological Survey river gage level file

IFD - Industrial Facilities Discharge file

IHS - In-House Software

NCC - National Computer Center

NPDES - National Pollutant Discharge Elimination System program

REACH - Hydrologic network file

SAS - Statistical Analysis System

SIC - Standard Industrial Classification

STORET - Computerized data base system maintained by the Environmental Protection Agency for the STOrage and RETrieval of data relating to the quality of the waterways within and contiguous to the United States

USGS - United States Geological Survey

Appendix B

STANDARD ABBREVIATIONS FOR USE IN REMARKS

ALK - alkalinity
AVG - average
CHEM - chemical
CMPD - compound
CONC - concentration
DEC - decrease
DEG - degrees
EST - estimate
FT - feet
G - grams
GAL - gallons
> - greater than
H - hours
HARD - hardness
INC - increase
KJL-N - Kjeldahl nitrogen
LAB - laboratory
< - less than
MAX - maximum
MED - medium
MIN - minimum
minutes are abbreviated as a fraction of the hour
MORT - mortality
POP - population
SP - species
TEMP - temperature
TDS - total dissolved solids, total solids, dissolved solids
TKN - total Kjeldahl nitrogen
TRC - total residual chlorine
TSS - total suspended solids
WK - weeks
WT - weight
YD - yards
YR - years

Appendix C

STATE CODES[1]

Name	Abbreviation	Code	Name	Abbreviation	Code
ALABAMA	AL	01	MISSOURI	MO	29
ALASKA	AK	02	MONTANA	MT	30
ARIZONA	AZ	04	NEBRASKA	NE	31
ARKANSAS	AR	05	NEVADA	NV	32
CALIFORNIA	CA	06	NEW HAMPSHIRE	NH	33
COLORADO	CO	08	NEW JERSEY	NJ	34
CONNECTICUT	CT	09	NEW MEXICO	NM	35
DELAWARE	DE	10	NEW YORK	NY	36
DISTRICT OF COLUMBIA	DC	11	NORTH CAROLINA	NC	37
FLORIDA	FL	12	NORTH DAKOTA	ND	38
GEORGIA	GA	13	OHIO	OH	39
HAWAII	HI	15	OKLAHOMA	OK	40
IDAHO	ID	16	OREGON	OR	41
ILLINOIS	IL	17	PENNSYLVANIA	PA	42
INDIANA	IN	18	RHODE ISLAND	RI	44
IOWA	IA	19	SOUTH CAROLINA	SC	45
KANSAS	KS	20	SOUTH DAKOTA	SD	46
KENTUCKY	KY	21	TENNESSEE	TN	47
LOUSIANA	LA	22	TEXAS	TX	48
MAINE	ME	23	UTAH	UT	49
MARYLAND	MD	24	VERMONT	VT	50
MASSACHUSETTS	MA	25	VIRGINIA	VA	51
MICHIGAN	MI	26	WASHINGTON	WA	53
MINNESOTA	MN	27	WEST VIRGINIA	WV	54
MISSISSIPPI	MS	28	WISCONSIN	WI	55
			WYOMING	WY	56

Note: The following codes are reserved for possible future use in identifying American Samoa (03), Canal Zone (07), Guam (14), Puerto Rico (43), and Virgin Islands (52).

[1] from STORET User's Handbook, Second Edition

Appendix D

SIC CODES[1]

SIC Codes in 22 Industrial Groups

Note: In the list below, some SIC codes are split between two Industrial Groups. A star (*) indicates those SIC codes which are split between two Industrial Groups, but are considered to belong only to the alternate group for processing purposes.

Code	Title	Code	Title
01	ORE MINING DRESSING	2292	Lace goods
1011	Iron ores	2293	Paddings and upholstery filling
1021	Copper ores	2294	Processed textile waste
1031	Lead and zinc ores	2295	Coated fabrics, not rubberized
1041	Gold ores	2296	Tire cord and fabric
1044	Silver ores	2297	Nonwoven fabrics
1051	Bauxite and other aluminum ores	2298	Cordage and twine
1061	Ferroalloy ores, except vanadium	2299	Textile goods, nec
1092	Mercury ores	2311	Men's and boy's suits and coats
1094	Uranium-radium-vanadium ores	2321	Men's and boy's shirts and nightwear
1099	Metal ores, nec	2322	Men's and boy's underwear
		2323	Men's and boy's neckwear
02	COAL MINING	2327	Men's and boy's separate trousers
1111	Anthracite	2328	Men's and boy's work clothing
1112	Anthracite mining services	2329	Men's and boy's clothing, nec
1211	Bituminous coal and lignite	2331	Women's and misses' blouses and waists
1213	Bituminous and lignite mining services	2335	Women's and misses' dresses
		2337	Women's and misses' suits and coats
		2339	Women's and misses' outerwear, nec
03	TEXTILE MILLS	2341	Women's and children's underwear
2211	Weaving mills, cotton	2342	Brassieres and allied garments
2221	Weaving mills, synthetics	2351	Millinery
2231	Weaving and finishing mills, wool	2352	Hats and caps, except millinery
2241	Narrow fabric mills	2361	Children's dresses and blouses
2251	Women's hosiery, except socks	2363	Children's coats and suits
2252	Hosiery, nec	2369	Children's outerwear, nec
2253	Knit outerwear mills	2371	Fur goods
2254	Knit underwear mills	2381	Fabric dress and work gloves
2257	Circular knit fabric mills	2384	Robes and dressing gowns
2258	Warp knit fabric mills	2385	Waterproof outergarments
2259	Knitting mills, nec	2386	Leather and sheep lined clothing
2261	Finishing plants, cotton	2387	Apparel belts
2262	Finishing plants, synthetics	2389	Apparel and accessories, nec
2269	Finishing plants, nec	2391	Curtains and draperies
2271	Woven carpets and rugs	2392	House furnishings, nec
2272	Tufted carpets and rugs	2393	Textile bags
2279	Carpets and rugs, nec	2394	Canvas and related products
2281	Yarn mills, except wool	2395	Pleating and stitching
2282	Throwing and winding mills	2396	Automotive and apparel trimmings
2283	Wool yarn mills	2397	Schiffi machine embroideries
2284	Thread mills	2399	Fabricated textile products, nec
2291	Felt goods, exc. woven felts and hats		

[1] from Status Report of the Industrial Facilities Discharge (IFD) File. March, 1983

SIC Codes in 22 Industrial Groups - (Continued)

Code	Title
04	TIMBER PRODUCTS PROCESSING
2411	Logging camps and logging contractors
2421	Sawmills and planning mills, general
2426	Hardwood dimension and flooring
2429	Special-product sawmills, nec
2431	Millwork
2434	Wood kitchen cabinets
2435	Hardwood veneer and plywood
2436	Softwood veneer and plywood
2439	Structural wood members, nec
2491	Wood preserving
2499	Wood products, nec
*2661	Building paper and board mills
05	PULP AND PAPERBOARD MILLS AND CONVERTED PAPER PRODUCTS
2611	Pulp mills
2621	Paper mills, except building paper
2631	Paperboard mills
2641	Paper coating and glazing
2642	Envelopes
2643	Bags, except textile bags
2645	Die-cut paper and board
2646	Pressed and molded pulp goods
2647	Sanitary paper products
2648	Stationery products
2649	Converted paper products, nec
2651	Folding paperboard boxes
2652	Set-up paperboard boxes
2653	Corrugated and solid fiber boxes
2654	Sanitary food containers
2655	Fiber cans, drums and similar products
2661	Building paper and board mills
2782	Blankbook and looseleaf binders
06	PAINT AND INK FORMULATING AND PRINTING
2711	Newspapers
2721	Periodicals
2731	Book publishing
2741	Miscellaneous publishing
2751	Commercial printing, letterpress
2752	Commercial printing, lithographic
2753	Engraving and plate printing
2754	Commercial printing, gravure
2761	Manifold business forms
2771	Greeting card publishing
2793	Photoengraving
2794	Electrotyping and stereotyping
2795	Lithographic platemaking services
2851	Paints, variables, lacquers and enamels
2893	Printing ink
*3951	Pens and mechanical pencils
3952	Lead pencils and art goods
3955	Carbon paper and inked ribbons
07	INORGANIC CHEMICALS MANUFACTURING
2812	Alkalies and chlorine
2813	Industrial gases
2816	Inorganic pigments
2819	Industrial inorganic chemicals, nec
08	PLASTICS AND SYNTHETIC MATERIALS MANUFACTURING
2821	Plastics materials and resins
*2822	Synthetic rubber
2823	Cellulosic man-made fibers
2824	Organic fibers, noncellulosic
09	MISCELLANEOUS CHEMICALS
2831	Biological products
2833	Medicinals and botanicals
2834	Pharmaceutical preparations
2861	Gum and wood chemicals
2879	Agricultural chemicals, nec
*2891	Adhesives and sealants
2892	Explosives
2895	Carbon black
2899	Chemical preparations, nec
3861	Photographic equipment and supplies
10	ORGANIC CHEMICALS MANUFACTURING
2865	Cyclic crudes and intermediates
2869	Industrial organic chemicals, nec
11	SOAP AND DETERGENT MANUFACTURING
2841	Soap and other detergents

SIC Codes in 22 Industrial Groups - (Continued)

Code	Title
12	PETROLEUM REFINING
2911	Petroleum refining
13	PAVING AND ROOFING MATERIALS (TARS AND ASPHALT)
2951	Paving mixtures and blocks
2952	Asphalt felts and coatings
3996	Hard surface floor coverings
14	RUBBER PROCESSING
2822	Synthetic rubber
2891	Adhesives and sealants
3011	Tires and inner tubes
3021	Rubber and plastics footwear
3031	Reclaimed rubber
3041	Rubber and plastics hose and belting
3069	Fabricated rubber products, nec
*3293	Gaskets, packing and sealing devices
15	LEATHER TANNING AND FINISHING
3111	Leather tanning and finishing
3131	Boot and shoe cut stock and findings
3142	House slippers
3143	Men's footwear, except athletic
3144	Women's footwear, except athletic
3149	Footwear, except rubber, nec
3151	Leather gloves and mittens
3161	Luggage
3171	Women's handbags and purses
3172	Personal leather goods, nec
3199	Leather goods, nec
16	IRON AND STEEL MANUFACTURING
3312	Blast furnaces and steel mills
3313	Electrometallurgical products
3315	Steel wire and related products
3316	Cold finishing of steel shapes
3317	Steel pipe and tubes
17	NONFERROUS METALS MANUFACTURING
*2819	Industrial inorganic chemicals, nec
3331	Primary copper
3332	Primary lead
3333	Primary zinc
3334	Primary aluminum
3339	Primary nonferrous metals, nec
3341	Secondary nonferrous metals
18	MACHINERY AND MECHANICAL PRODUCTS MANUFACTURING
*3021	Rubber and plastics footware
*3041	Rubber and plastics hose and belting
3079	Miscellaneous plastics products
3293	Gaskets, packing, and sealing devices
3321	Gray iron foundries
3322	Malleable iron foundries
3324	Steel investment foundries
3325	Steel foundries, nec
3351	Copper rolling and drawing
3353	Aluminum sheet, plate, and foil
3354	Aluminum extruded products
3355	Aluminum rolling and drawing, nec
3356	Nonferrous rolling and drawing, nec
3357	Nonferrous wire drawing and insulating
3361	Aluminum foundries
3362	Brass, bronze, and copper foundries
3369	Nonferrous foundries, nec
3398	Metal heat treating
3399	Primary metal products, nec
3411	Metal cans
3412	Metal barrels, drums, and pails
3421	Cutlery
3423	Hand and edge tools, nec
3425	Hand saws and saw blades
3429	Hardware, nec
3431	Metal sanitary ware
3432	Plumbing fittings and brass goods
3433	Heating equipment, except electric
3441	Fabricated structural metal
3442	Metal doors, sash, and trim
3443	Fabricated plate work (boiler shops)
3444	Sheet metal work
3446	Architectural metal work
3448	Prefabricated metal buildings
3449	Miscellaneous metal work
3451	Screw machine products
3452	Bolts, nuts, rivets, and washers
3462	Iron and steel forgings
3463	Nonferrous forgings
3465	Automotive stampings

SIC Codes in 22 Industrial Groups - (Continued)

Code	Title	Code	Title
3466	Crowns and closures	3568	Power transmission equipment, nec
3469	Metal stampings, nec	3569	General industrial machinery, nec
3482	Small arms ammunition	3572	Typewriters
3483	Ammunition, exc. for small arms, nec	3573	Electronic computing equipment
		3574	Calculating and accounting machines
3484	Small arms	3576	Scales and balances exc. laboratory
3489	Ordnance and accessories, nec	3579	Office machines, nec
3493	Steel springs, except wire	3581	Automatic merchandising machines
3494	Valves and pipe fittings	3582	Commercial laundry equipment
3495	Wire springs	3585	Refrigeration and heating equipment
3496	Misc. fabricated wire products	3586	Measuring and dispensing pumps
3497	Metal foil and leaf	3589	Service industry machinery, nec
3498	Fabricated pipe and fittings	3592	Carburetors, pistons, rings, valves
3499	Fabricated metal products, nec	3599	Machinery, except electrical, nec
3511	Turbines and turbine generator sets	3612	Transformers
		3613	Switchgear and switchboard apparatus
3519	Internal combustion engines, nec	3621	Motors and generators
3523	Farm machinery and equipment	3622	Industrial controls
3524	Lawn and garden equipment	3623	Welding apparatus, electric
3531	Construction machinery	3624	Carbon and graphite products
3532	Mining machinery	3629	Electrical industrial apparatus, nec
3533	Oil field machinery	3631	Household cooking equipment
3534	Elevators and moving stairways	3632	Household refrigerators and freezers
3535	Conveyors and conveying equipment	3633	Household laundry equipment
3536	Hoists, cranes, and monorails	3634	Electric housewares and fans
3537	Industrial trucks and tractors	3635	Household vacuum cleaners
3541	Machine tools, metal cutting types	3639	Household appliances, nec
3542	Machine tools, metal forming types	3641	Electric lamps
3544	Special dies, tools, jigs and fixtures	3643	Current-carrying wiring devices
		3644	Noncurrent-carrying wiring devices
3545	Machine tool accessories	3645	Residential lighting fixtures
3546	Power driven hand tools	3646	Commercial lighting fixtures
3547	Rolling mill machinery	3647	Vehicular lighting equipment
3549	Metalworking machinery, nec	3648	Lighting equipment, nec
3551	Food products machinery	3651	Radio and TV receiving sets
3552	Textile machinery	3652	Phonograph records
3553	Woodworking machinery	3661	Telephone and telegraph apparatus
3554	Paper industries machinery	3662	Radio and TV communication equipment
3555	Printing trades machinery	3671	Electron tubes, receiving type
3559	Special industry machinery, nec	3672	Cathode ray television picture tubes
3561	Pumps and pumping equipment	3673	Electron tubes, transmitting
3562	Ball and roller bearings	3674	Semiconductors and related devices
3563	Air and gas compressors	3675	Electronic capacitors
3564	Blowers and fans	3676	Electronic resistors
3565	Industrial patterns	3677	Electronic coils and transformers
3566	Speed changers, drives, and gears	3678	Electronic connectors
3567	Industrial furnaces and ovens	3679	Electronic components, nec

SIC Codes in 22 Industrial Groups - (Continued)

Code	Title
3691	Storage batteries
3692	Primary batteries, dry and wet
3693	X-ray apparatus and tubes
3694	Engine electrical equipment
3699	Electrical equipment and supplies, nec
3711	Motor vehicles and car bodies
3713	Truck and bus bodies
3714	Motor vehicle parts and accessories
3715	Truck trailers
3721	Aircraft
3724	Aircraft engines and engine parts
3728	Aircraft equipment, nec
3731	Ship building and repairing
3732	Boat building and repairing
3743	Railroad equipment
3751	Motorcycles, bicycles, and parts
3761	Guided missiles and space vehicles
3764	Space propulsion units and parts
3769	Space vehicle equipment, nec
3792	Travel trailers and campers
3795	Tanks and tank components
3799	Transportation equipment, nec
3811	Engineering and scientific instruments
3822	Environmental controls
3823	Process control instruments
3824	Fluid meters and counting devices
3825	Instruments to measure electricity
3829	Measuring and controlling devices, nec
3832	Optical instruments and lenses
3841	Surgical and medical instruments
3842	Surgical appliances and supplies
3843	Dental equipment and supplies
3851	Ophthalmic goods
3873	Watches, clocks, and watchcases
3911	Jewelry, precious metal
3914	Silverware and plated ware
3915	Jewelers' materials and lapidary work
3931	Musical instruments
3942	Dolls
3944	Games, toys, and children's vehicles
3949	Sporting and athletic goods, nec
3951	Pens and mechanical pencils
3961	Costume jewelry
3991	Brooms and brushes
3993	Signs and advertising displays
3995	Burial caskets
19	ELECTROPLATING
3471	Plating and polishing
3479	Metal coating and allied services
20	ELECTRIC SERVICES
4911	Electric services
21	AUTO AND OTHER LAUNDRIES
7211	Power laundries, family and commercial
7213	Linen supply
7214	Diaper service
7215	Coin-operated laundries and cleaning
7216	Dry cleaning plants, except rug
7217	Carpet and upholstery cleaning
7218	Industrial launderers
7219	Laundry and garment services, nec
7542	Car washes
22	SEWERAGE SYSTEMS
4952	Sewerage systems

SIC Codes in Reserved Group

Code	Title	Code	Title
1311	Crude petroleum and natural gas	2092	Fresh and frozen packaged fish
		2095	Roasted coffee
2011	Meat packing plants	2097	Manufactured ice
2013	Sausages and other prepared meats	2098	Macaroni and spaghetti
2016	Poultry dressing plants	2099	Food preparations, nec
2017	Poultry and egg processing		
2021	Creamery butter	2111	Cigarettes
2022	Cheese, natural and processed	2121	Cigars
2023	Condensed and evaporated milk	2131	Chewing and smoking tobacco
2024	Ice cream and frozen desserts	2141	Tobacco stemming and redrying
2026	Fluid milk		
2032	Canned specialties	2441	Nailed wood boxes and shook
2033	Canned fruits and vegetables	2448	Wood pallets and skids
2034	Dehydrated fruits, vegetables, soups	2449	Wood containers, nec
		2451	Mobile homes
2035	Pickles, sauces, and salad dressings	2452	Prefabricated wood buildings
		2492	Particleboard
2037	Frozen fruits and vegetables		
2038	Frozen specialties	2511	Wood household furniture
2041	Flour and other grain mill products	2512	Upholstered household furniture
		2514	Metal household furniture
2043	Cereal breakfast foods	2515	Mattresses and bedsprings
2044	Rice milling	2517	Wood TV and radio cabinets
2045	Blended and prepared flour	2519	Household furniture, nec
2046	Wet corn milling	2521	Wood office furniture
2047	Dog, cat, and other pet food	2522	Metal office furniture
2048	Prepared feeds, nec	2531	Public building and related furniture
2051	Bread, cake, and related products	2541	Wood partitions and fixtures
2052	Cookies and crackers	2542	Metal partitions and fixtures
2061	Raw cane sugar	2591	Drapery hardware and blinds and shades
2062	Cane sugar refining	2599	Furniture and fixtures, nec
2063	Beet sugar		
2065	Confectionery products	2732	Book printing
2066	Chocolate and cocoa products	2789	Bookbinding and related work
2067	Chewing gum	2791	Typesetting
2074	Cottonseed oil mills		
2075	Soybean oil mills	2842	Polishes and sanitation goods
2076	Vegetable oil mills, nec	2843	Surface active agents
2077	Animal and marine fats and oils	2844	Toilet preparations
2079	Shortening and cooking oils	2873	Nitrogenous fertilizers
2082	Malt beverages	2874	Phosphatic fertilizers
2083	Malt	2875	Fertilizers, mixing only
2084	Wines, brandy, and brandy spirits		
2085	Distilled liquor, except brandy	2992	Lubricating oils and greases
2086	Bottled and canned soft drinks	2999	Petroleum and coal products, nec
2087	Flavoring extracts and sirups, nec		
2091	Canned and cured seafoods	3211	Flat glass

SIC Codes in Reserved Group - (Continued)

Code	Title	Code	Title
3221	Glass containers		
3229	Pressed and blown glass, nec		
3231	Products of purchased glass		
3241	Cement, hydraulic		
3251	Brick and structural clay tile		
3253	Ceramic wall and floor tile		
3255	Clay refractories		
3259	Structural clay products, nec		
3261	Vitreous plumbing fixtures		
3262	Vitreous china food utensils		
3263	Fine earthenware food utensils		
3264	Porcelain electrical supplies		
3269	Pottery products, nec		
3271	Concrete block and brick		
3272	Concrete products, nec		
3273	Ready-mixed concrete		
3274	Lime		
3275	Gypsum products		
3281	Cut stone and stone products		
3291	Abrasive products		
3292	Asbestos products		
3295	Minerals, ground or treated		
3296	Mineral wool		
3297	Nonclay refractories		
3299	Nonmetallic mineral products, nec		
3636	Sewing machines		
3953	Marking devices		
3962	Artificial flowers		
3963	Buttons		
3964	Needles, pins, and fasteners		
4931	Electric and other services combined		
4941	Water supply		
4953	Refuse systems		
4961	Steam supply		
7212	Garment pressing and cleaners' agents		
7534	Tire retreading and repair shops		
7535	Paint shops		
7538	General automotive repair shops		
7539	Automotive repair shops, nec		

Appendix E

EFFLUENT TREATMENT PROCESSES[1]

Physical Treatment Processes

1A = Ammonia stripping
1B = Dialysis
1C = Diatomaceous earth filtration
1D = Distillation
1E = Electrodialysis
1F = Evaporation
1G = Flocculation
1H = Flotation
1I = Foam fractionation
1J = Freezing
1K = Gas-phase separation
1L = Grinding (comminutors)
1M = Grit removal
1N = Microstaining
1O = Mixing
1P = Moving bed filters
1Q = Multimedia filtration
1R = Rapid sand filtration
1S = Reverse osmosis (hyperfiltration)
1T = Screening
1U = Sedimentation (settling)
1V = Slow sand filtration
1W = Solvent extraction
IX = Sorption

Chemical Treatment Processes

2A = Carbon adsorption
2B = Chemical oxidation
2C = Chemical precipitation
2D = Coagulation
2E = Dechlorination
2F = Disinfection (chlorine)
2G = Disinfection (ozone)
2H = Disinfection (other)
2I = Electrochemical treatment
2J = Ion exchange
2K = Neutralization
2L = Reduction

Biological Treatment Processes

3A = Activated sludge
3B = Aerated lagoons
3C = Anaerobic treatment
3D = Nitrification-denitrification
3E = Pre-aeration
3F = Spray irrigation/land application
3G = Stabilization ponds
3H = Trickling filtration

Other Processes

4A = Discharge to surface water
4B = Ocean discharge through outfall
4C = Reuse/recycle of treated effluent
4D = Underground injection

Sludge Treatment and Disposal Processes

5A = Aerobic digestion
5B = Anaerobic digestion
5C = Belt filtration
5D = Centrifugation
5E = Chemical conditioning
5F = Chlorine treatment
5G = Composting
5H = Drying beds
5I = Elutiation
5J = Flotation thickening
5K = Freezing
5L = Gravity thickening
5M = Heat drying
5N = Heat treatment
5O = Incineration
5P = Land application
5Q = Landfill
5R = Pressure filtration
5S = Pyrolysis
5T = Sludge lagoons
5U = Vacuum filtration
5V = Vibration
5W = Wet oxidation
UN = Unknown

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[1] from NPDES Application 2C, Table 1

Appendix F

STANDARD ABBREVIATIONS USED FOR RECEIVING WATER NAMES[1]

Abbreviation	Name	Abbreviation	Name
AB	above	RN	run
AR*	arroyo	SL**	slough
BL	below	SND**	sound
B	branch	S	south
BK	brook	STT**	strait
CA	canal	STR	stream
CH**	channel	TR	tributary
CL	coulee	UP**	upper
C	creek	W	west
D	ditch	WA*	wash
DI	distributary		
E	east	EB	east branch
ES	estuary	MB	middle branch
F	fork	NB	north branch
HBR**	harbor	SB	south branch
LK	lake	WB	west branch
LD*	land		
L	little		
LW**	lower	EF	east fork
M	middle	MF	middle fork
N	north	NF	north fork
NR	near	SF	south fork
P	pond	WF	west fork
R	river		
RE	reservoir		

Note: The above list of abbreviations are those commonly used by the USGS unless otherwise denoted.

* Taken from a list of standard abbreviations used by the EPA.

** Not elsewhere classified, derived at Stearns, Conrod and Schmidt Consulting Engineers, Inc.

[1] from Industrial Facilities Discharge File Final Report. Volume 1, January, 1981.

Appendix G

MAJOR/MINOR BASIN CODES[1]

The following contains complete listings of the major and minor river basin codes which the EPA has defined for the waterways within the United States. There are 23 major river basins defined within the U.S., with a variable number of minor basins defined within each major basin. The listings are in order by major basin code, and minor basin code within major basin.

Major River Basins

CODE	NAME
01	NORTHEAST
02	NORTH ATLANTIC
03	SOUTHEAST
04	TENNESSEE RIVER
05	OHIO RIVER
06	LAKE ERIE
07	UPPER MISSISSIPPI RIVER
08	LAKE MICHIGAN
09	MISSOURI RIVER
10	SOUTH CENTRAL LOWER MISSISSIPPI RIVER
11	COLORADO RIVER
12	WESTERN GULF
13	PACIFIC NORTHWEST
14	CALIFORNIA
15	GREAT BASIN
16	ALASKA
17	HAWAII
18	PUERTO RICO
19	VIRGIN ISLANDS
20	OCEANIA
21	LAKE HURON
22	LAKE SUPERIOR
23	HUDSON BAY

Minor River Basins

Listings of the minor river basins appear under the major river basin sequences on the following pages.

[1]from STORET User's Handbook, Second Edition

01 NE NORTHEAST

01	QUINNIPIAC RIVER & WESTERN CONN COASTAL
02	HOUSATONIC RIVER
03	PAWCATUCK RIVER & EASTERN CONN COASTAL
04	CONNECTICUT RIVER
05	THAMES RIVER
06	NARRAGANSETT BAY
08	MASSACHUSETTS COASTAL
09	MERRIMACK RIVER
10	PISCATAQUA RIVER & NEW HAMPSHIRE COASTAL
12	SACO RIVER & SOUTH MAINE COASTAL
14	PRESUMPSCOT RIVER AND CASCO BAY
15	ANDROSCOGGIN RIVER
16	KENNEBEC AND SHEEPSCOT RIVER
17	PENOBSCOT RIVER
18	NORTH MAINE COASTAL
19	ST. CROIX RIVER
20	ST. JOHNS RIVER
21	LAKE MEMPHREMAGOG
24	LAKE CHAMPLAIN
25	ST. LAWRENCE RIVER
26	LAKE ONTARIO SHRE - OSWEGO RIVER TO ST. LAWRENCE RIVER
27	NIAGARA RIVER
28	GENESEE RIVER
29	OSWEGO RIVER
30	MOHAWK RIVER
31	UPPER HUDSON RIVER
32	MIDDLE HUDSON RIVER
33	LOWER HUDSON-NEW YORK METROPOLITAN AREA
34	NEW JERSEY COAST
35	LAKE ERIE SHORE & MINOR TRIBUTARIES
36	LAKE ONTARIO SHORE - GENESEE R - OSWEGO R
37	LAKE ONTARIO SHORE - NIAGARA R - GENESEE R
38	ST. REGIS RIVER

02 NA NORTH ATLANTIC

03	DELAWARE RIVER - ZONE 1
04	DELAWARE RIVER - LEHIGH
05	DELAWARE RIVER - SCHUYLKILL
06	DELAWARE RIVER - ZONE 2
07	DELAWARE RIVER - ZONE 3
08	DELAWARE RIVER - ZONE 4
12	SUSQUEHANNA RIVER
13	UPPER CHESAPEAKE BAY & MD-DEL COASTAL DEL-MARVA
14	POTOMAC RIVER
15	RAPPAHANNOCK AND YORK RIVERS - VIRGINIA COAST
16	JAMES RIVER

03 SE SOUTHEAST

01	CHOWAN RIVER
02	ROANOKE RIVER
03	TAR RIVER
04	NEUSE RIVER
05	NORTH CAROLINA COASTAL AREA
06	CAPE FEAR RIVER
07	YADKIN-PEE DEE-LOWER PEE DEE RIVER
08	CATAWBA-WATEREE, CONGAREE, SANTEE-COOPER RESERVOIR
09	EDISTO-COMBAHEE RIVER
13	SAVANNAH RIVER
14	OGEECHEE RIVER
15	OCOMEE RIVER
16	OCOMULGEE RIVER
17	ALTAMAHA RIVER
18	SATILLA RIVER
19	ST. MARYS-NASSAU RIVER
20	ST. JOHNS RIVER
21	SUWANNEE RIVER
22	OCHLOCKONEE-ST. MARKS RIVER
23	WITHLACOOCHEE RIVER
24	TAMPA BAY AREA
25	PEACE RIVER
26	KISSIMMEE RIVER
27	FLORIDA EAST COASTAL AREA
28	LOWER FLORIDA AREA
29	FLINT RIVER
30	CHATTACHOOCHEE RIVER
31	APALACHICOLA RIVER
32	CHOCTAWHATCHEE RIVER
33	PERDIDO-ESCAMBIA RIVER
34	TALLAPOOSA RIVER
35	COOSA RIVER
36	CAHABA RIVER
37	ALABAMA RIVER
38	UPPER TOMBIGBEE RIVER
39	WARRIOR RIVER
40	LOWER TOMBIGBEE RIVER
41	MOBILE BAY AREA
42	PASACAGOULA RIVER
43	PEARL RIVER

04 TR TENNESSEE RIVER

01	CLINCH RIVER
02	HOLSTON RIVER
03	FRENCH BROAD RIVER
04	LITTLE TENNESSEE RIVER
05	HIWASSEE RIVER
06	ELK RIVER
07	DUCK RIVER
08	TENNESSEE RIVER - MAIN STEM & MINOR TRIBS

05 OR OHIO RIVER

01	ALLEGHENY RIVER
02	MONONGAHELA RIVER
03	BEAVER RIVER
04	MUSKINGUM RIVER
05	LITTLE KANAWHA RIVER
06	HOCKING RIVER
07	KANAWHA RIVER
08	GUYANDOT RIVER
09	BIG SANDY RIVER
10	SCIOTO RIVER
11	LITTLE MIAMI RIVER
12	LICKING RIVER
13	MIAMI RIVER
14	KENTUCKY RIVER
15	SALT RIVER
16	GREEN RIVER
17	WABASH RIVER
18	EAST FORK WHITE RIVER
19	WEST FORK WHITE RIVER
20	CUMBERLAND RIVER
21	OHIO RIVER - MAIN STEM & MINOR TRIBS

06 LE LAKE ERIE

01	MAUMEE RIVER
02	SANDUSKY RIVER
03	CUYAHOGA RIVER
04	LAKE ERIE SHORE - MAUMEE R TO SANDUSKY R
05	LAKE ERIE SHORE - SANDUSKY R TO CUYAHOGA R
06	LAKE ERIE SHORE - CUYAHOGA R TO N.Y. STATE LINE
11	RAISIN
12	HURON
13	DETROIT
14	CLINTON
15	ST. CLAIR

07 UM UPPER MISSISSIPPI RIVER

03	UPPER PORTION UPPER MISSISSIPPI RIVER
04	MINNESOTA RIVER
05	ST. CROIX
06	LOWER PORTION UPPER MISSISSIPPI RIVER
07	WISCONSIN RIVER
08	MISSISSIPPI-WAPSIPINICON & TRIBUTARIES
09	ROCK RIVER
10	MISSISSIPPI-IOWA-CEDAR RIVERS
11	MISSISSIPPI-DES MOINES-SKUNK RIVERS
12	MISSISSIPPI-SALT RIVERS
13	CHICAGO-CALUMET RES.-DES PLAINES RIVER
15	KANKAKEE RIVER
16	FOX RIVER
17	ILLINOIS RIVER

	18	MISSISSIPPI-ST. LOUIS AREA
	19	MERAMEC RIVER
	20	KASKASKIA RIVER
	21	BIG MUDDY RIVER
	22	MISSISSIPPI RIVER-CAPE GIRARDEAU AREA
08 LM	LAKE MICHIGAN	
	03	MENOMINEE
	04	CEDAR
	05	FORD
	06	ESCANABA
	07	RAPID
	08	WHITEFISH
	09	STURGEON
	10	FISHDAM
	11	MANISTIQUE
	12	MILLECOQUINS
	13	BEAR
	14	PINE
	15	ELK
	16	BOARDMAN
	17	PLATTE
	18	BETSIE
	19	MANISTEE
	20	BIG SABLE
	21	PERE MARQUETTE
	22	PENTWATER
	23	WHITE
	24	GREEN BAY - WESTERN SHORE
	25	FOX RIVER-WOLF CREEK
	26	LAKE MICHIGAN - WESTERN SHORE
	27	MUSKEGON
	28	GRAND
	29	BLACK RIVER AT LAKE MACATAWA
	30	KALAMAZOO
	31	BLACK RIVER AT SOUTH HAVEN
	32	ST. JOSEPH RIVER
	33	GALIEN
	49	CALUMET-BURNS DITCH COMPLEX
09 MR	MISSOURI RIVER	
	01	UPPER MISSOURI RIVER - HEADWATERS TO MILK RIVER
	02	YELLOWSTONE RIVER
	03	N CENTRAL MISSOURI R - MILK R TO SPRING CREEK
	04	S CENTRAL MISSOURI R - SPRING CREEK TO NIOBRARA R
	05	NIOBRARA RIVER
	06	JAMES RIVER
	07	BIG SIOUX RIVER
	08	LOWER PLATTE R FROM NORTH PLATTE
	09	NORTH PLATTE RIVER
	10	SOUTH PLATTE RIVER
	11	KANSAS RIVER

	12	LOWER MISSOURI R FROM NIOBRARA R
	13	GRAND-CHARITON RIVERS
	14	OSAGE-GASCONADE RIVERS
10 SM	SOUTH CENTRAL LOWER MISSISSIPPI RIVER	
	01	UPPER ARKANSAS R ABOVE KANSAS-COLORADO STATE LINE
	02	ARKANSAS R - KANSAS-COLORADO STATE LINE TO TULSA
	03	VERDIGRIS RIVER
	04	GRAND NEOSHO RIVER
	05	WHITE RIVER
	06	LOWER MISSISSIPPI R - CAIRO TO HELENA ARK
	07	CIMARRON RIVER-NEX MEX-COLO-KANSAS-OKLA
	08	NORTH CANADIAN RIVER
	09	ARKANSAS RIVER - TULSA TO VAN BUREN
	10	ARKANSAS RIVER - VAN BUREN TO MOUTH
	11	LOWER MISSISSIPPI RIVER-YAZOO RIVER
	12	SOUTH CANADIAN RIVER - ABOVE TEX-OKLA STATE LINE
	13	SOUTH CANADIAN RIVER - BELOW TEX-OKLA STATE LINE
	14	WASHITA RIVER
	15	UPPER RED RIVER - ABOVE DENISON
	16	LOWER RED RIVER - BELOW DENISON
	17	OUACHITA RIVER
	18	LOWER MISSISSIPPI RIVER-BIG BLACK RIVER
	19	ATCHAFALAYA RIVER
	20	CALCASIEU RIVER
	21	LOWER MISSISSIPPI RIVER - NATCHEZ TO GULF
11 CR	COLORADO RIVER	
	01	LOWER COLORADO RIVER
	02	MIDDLE COLORADO RIVER-SAN JUAN RIVER
	03	UPPER COLORADO RIVER
	04	GILA RIVER
	05	LITTLE COLORADO RIVER
	06	GREEN RIVER
	20	DEAD BASIN 01
	21	DEAD BASIN 02
	22	DEAD BASIN 03
	23	DEAD BASIN 04
	24	DEAD BASIN 05
	25	DEAD BASIN 06
	26	DEAD BASIN 07
	27	DEAD BASIN 08
	28	DEAD BASIN 09
	29	DEAD BASIN 10
12 WG	WESTERN GULF	
	01	SABINE RIVER
	02	NECHES RIVER
	03	TRINITY & SAN JACINTO RIVERS
	04	BRAZOS RIVER

	05	COLORADO RIVER
	06	GUADELUPE LAVACA & SAN ANTONIO BASIN
	07	NUECES RIVER
	08	UPPER PECOS RIVER
	09	RIO GRANDE UPPER ABOVE PECOS RIVER
	10	RIO GRANDE LOWER BELOW PECOS RIVER
13 PN	PACIFIC NORTHWEST	
	01	KOOTENAI RIVER
	02	CLARK FORK-PEND OREILLE RIVER
	03	SPOKANE RIVER
	04	YAKIMA RIVER
	05	COLUMBIA RIVER ABOVE YAKIMA RIVER
	06	UPPER SNAKE RIVER
	07	CENTRAL SNAKE RIVER
	08	MIDDLE & LOWER SNAKE RIVER
	09	WILLAMETTE RIVER
	10	COLUMBIA RIVER BELOW YAKIMA RIVER
	11	PUGET SOUND
	12	WASHINGTON COAST
	13	OREGON COAST
	14	SOUTHERN OREGON LAKES
14 CL	CALIFORNIA	
	01	KLAMATH RIVER
	02	NORTH COASTAL
	03	SAN FRANCISCO BAY REGION
	04	CENTRAL COASTAL
	05	SANTA CLARA RIVER
	06	LOS ANGELES RIVER
	07	SANTA ANA RIVER
	08	SAN DIEGO COASTAL REGION
	09	SACRAMENTO RIVER
	10	SAN JOAQUIN RIVER
	11	KINGS & KERN RIVERS AND TULARE LAKE
15 GB	GREAT BASIN	
	01	NORTHWESTERN LAHONTAN
	02	HUMBOLDT RIVER
	03	CENTRAL NEVADA
	04	OWENS RIVER
	05	MOJAVE RIVER
	06	COLORADO RIVER BASIN REGION OF CALIFORNIA
	07	GREAT SALT LAKE
	08	SEVIER RIVER
16 AL	ALASKA	
	01	ARCTIC SLOPE (COLVILLE & SAGAVAHIRKTOK RES)
	02	N W (KOTSEVUR SOUND, NOATAK & KOBUK RES)

		03	YUKON RIVER
		04	KUSKOKWIM RIVER
		05	BRISTOL BAY - BUSHAGAK & MULCHATNA RIVERS
		06	SOUTHERN ALASKA PENINSULA
		07	EAST COOK INLET-SUSITNA RIVER
		08	KENAI & KNIK ARM RIVERS
		09	KODIAK ISLAND
		10	COPPER RIVER
		11	YAKUTAT BAY
		12	SOUTHEASTERN ALASKA
17	HA	HAWAII	
		01	HAWAII
		02	HONOLULU OAHU ISLAND
		03	KAUAI CO-KAUAI, MIIHAU & SMALL ISLANDS
		04	MAUI-KALAWAO CO
18	PR	PUERTO RICO	
			PUERTO RICO
19	VI	VIRGIN ISLANDS	
			VIRGIN ISLANDS
20	OC	OCEANIA	
		01	GUAM
		02	MARIANA ISLANDS
		03	PALAU
		04	YAP
		05	PONAPE
		06	TRUK
		07	MARSHALL ISLANDS
		08	AMERICAN SAMOA
21	LH	LAKE HURON	
		01	CHERRY CREEK
		02	PIGEON
		03	WISCOGGIN
		04	SAGINAW
		05	KAWKAWLIN
		06	RIFLE
		07	AUGRES
		08	AUSABLE
		09	BLACK (AT BLACK RIVER)
		10	THUNDER BAY
		11	SWAN CREEK
		12	OCQUEOC
		13	CHEBOYGAN
		14	CARP

	15	PINE
	16	MUNUSCONG
	17	CHARLOTTE
	18	WAISKA
22	LS	LAKE SUPERIOR
	01	PENDILLS
	02	TAHQUAMENON
	03	TWO HEARTED
	04	AUTRAIN
	05	CHOCOLAY
	06	CARP
	07	SALMON TROUT
	08	STURGEON (HOUGHTON COUNTY)
	09	TOBACCO
	10	PORTAGE LAKE
	11	MISERY
	12	ONTONAGON
	13	IRON
	14	PRESQUE ISLE
	15	MONTREAL
	16	WISC & MINN DRAINAGE
23	HB	HUDSON BAY
	01	RED RIVER OF THE NORTH
	02	RAINY RIVER
	03	DEVILS LAKE AREA
	04	SOURIS RIVER

Appendix H

SAMPLE DATA SHEETS AND CODING FORMS

The following section contains an example of how data were coded from two hypothetical unpublished complex effluent bioassay studies. The pertinent data from the first and second bioassay studies (pages F-2, F-3 and F-4, F-5, respectively) were reviewed and encoded onto the data record forms (pages F-6 to F-8) as Test 1 and Test 2, respectively.

Test 1 provides an example of an acute test where an effect endpoint was not calculated. The lowest concentration that caused 100% mortality at the earliest time was recorded. In addition, note that the water chemistry data was recorded for the 0-48 hour range, and a 310 remark was made to indicate that the entire test lasted 96 hours.

Test 2 provides an example of LC50 values calculated for 24, 48, 72 and 96 hour periods. Note that the water chemistry range for the entire 96 hours was recorded. In addition, ditto marks were used to indicate duplicate information from Test 1. Replicate information from sections 20-80 was indicated by drawing a line through those sections.

Test 1 Example

Toxicity Test Data - Static - Freshwater

Industry/Toxicant Facility Name

Address City, State

Contact ____

Effluent Serial Number 001

NPDES Permit Number MN0000000

Technician ____

Beginning: Date 01/09/84 . Time 1030

Ending: Date 01/13/84 Time 1030

Test Organism Fathead Minnow

Test organism age or size 2 weeks

Test jar size 0.96 l; solution volume 750 ml

Dilution water used well water

All animals: ___ Fed daily X Unfed ___ Fed irregularly (describe): ____

Sample: X Grab. Collected 0830 (a.m.)/p.m. on 01 / 09 / 84 .

___ Composite. Collected ____ a.m./p.m. to ____ a.m./p.m. on ___/___/___ to ___/___/___

Aeration: X None ___ Slow ___ Moderate ___ Vigorous single-bubble, beginning hr. ___ in all test containers.

Condition of surviving animals at test conclusion ____

STATIC TEST CONCENTRATION SERIES

Wastewater Concentration (%)	Test Concentration Formulations (ml)									
	Quart Jars (0.96L)		Gallon Jars (3.85 L)		3-Gal Jars (11.55L)		5-Gal Jars (19.25L)		Culture Dish (0.25L)	
	Waste	Dilution	Waste	Dilution	Waste	Dilution	Waste	Dilution	Waste	Dilution
0	0	750	0	3000	0	8000	0	15,000	0	200
5.6	42	708	168	2832	448	7552	840	14,160	11.2	188.8
10.0	75	675	300	2700	800	7200	1500	13,500	20	180
18.0	135	615	540	2460	1440	6560	2700	12,300	36	164
32.0	240	510	960	2040	2560	5440	4800	10,200	64	136
56.0	420	330	1680	1320	4480	3520	8400	6,600	112	88
75.0	562.5	187.5	2250	750	6000	2000	11,250	3,750	150	50
100.0	750	0	3000	0	8000	0	15,000	0	200	0
Total wastewater required (mL per replicate)	2224.5		8898		23,728		44,490		593.2	

Test 1 Example - (continued)

Industry/Toxicant Facility Name

Test Organism Fathead Minnow

Toxicity Test Data - Static - Freshwater

Conc. Wastewater (%)	Test Container Number	Number of Live Organisms					D.O. (mg/L)					pH					Total Alkalinity (mg/L)					Hardness (mg/L)				
		0-h	24h	48h	72h	96h	0-h	24h	48h	72h	96h	0-h	24h	48h	72h	96h	0-h	24h	48h	72h	96h	0-h	24h	48h	72h	96h
0	1	10	10	10	10	10	12.6					7.2					42					102				
0	2	10	10	10	10	10	12.5					7.2					43					103				
5.6	3	10	10	10	10	10	12.8					7.3					45					109				
5.6	4	10	10	10	10	10	12.6					7.3					55					110				
10.0	5	10	10	10	10	10	12.0					7.5					65					120				
10.0	6	10	10	10	10	10	11.9					7.5					64					121				
18.0	7	10	10	9	9	9	10.6					7.7					81					130				
18.0	8	10	9	9	9	8	10.6					7.6					83					131				
32.0	9	10	9	8	6	4	10.0					8.0					102					152				
32.0	10	10	9	9	8	6	10.0					8.1					105					155				
56.0	11	10	6	3	0	0	9.0					8.5					156					173				
56.0	12	10	5	2	0	0	9.0					8.4					155					174				
75.0	13	10	3	1	0	0	8.8					8.6					186					197				
75.0	14	10	2	1	0	0	8.8					8.6					187					198				
100.0	15	10	1	0	0	0	8.7					8.9					235					251				
100.0	16	10	2	0	0	0	8.6					9.0					234					252				

Comments: No Cl detected
Test temperature 23±1°C
Conductivity 100-450 umhos/cm

Test 2 Example

Toxicity Test Data - Static - Freshwater

Industry/Toxicant Facility Name

Address City, State

Contact

Effluent Serial Number 001

NPDES Permit Number MN0000000

Technician

Beginning: Date 01/09/84 Time 1100

Ending: Date 01/13/84 Time 1100

Test Organism Daphnia pulex, from culture

Test organism age or size 24-48H

Test jar size 0.75 l; solution volume 250 ml

Dilution water used well water

All animals: ___ Fed daily X Unfed ___ Fed irregularly (describe):

Sample: X Grab. Collected 0830 (a.m./p.m.) on 01 / 09 / 84 .

___ Composite. Collected _____ a.m./p.m. to ____ a.m./p.m. on ___/___/___ to ___/___/___

Aeration: X None ___ Slow ___ Moderate ___ Vigorous single-bubble, beginning hr. ___ in all test containers.

Condition of surviving animals at test conclusion

STATIC TEST CONCENTRATION SERIES

Wastewater Concentration (%)	Test Concentration Formulations (ml)									
	Quart Jars (0.96L)		Gallon Jars (3.85 L)		3-Gal Jars (11.55L)		5-Gal Jars (19.25L)		Culture Dish (0.25L)	
	Waste	Dilution	Waste	Dilution	Waste	Dilution	Waste	Dilution	Waste	Dilution
0	0	750	0	3000	0	8000	0	15,000	0	200
5.6	42	708	168	2832	448	7552	840	14,160	11.2	188.8
10.0	75	675	300	2700	800	7200	1500	13,500	20	180
18.0	135	615	540	2460	1440	6560	2700	12,300	36	164
32.0	240	510	960	2040	2560	5440	4800	10,200	64	136
56.0	420	330	1680	1320	4480	3520	8400	6,600	112	88
75.0	562.5	187.5	2250	750	6000	2000	11,250	3,750	150	50
100.0	750	0	3000	0	8000	0	15,000	0	200	0
Total wastewater required (mL per replicate)	2224.5		8898		23,728		44,490		593.2	

Test 2 Example - (continued)

Industry/Toxicant Facility Name Test Organism Daphnia pulex

Toxicity Test Data - Static - Freshwater

Conc. Wastewater (%)	Test Container Number	Number of Live Organisms					D.O. (mg/L)					pH					Total Alkalinity (mg/L)					Hardness (mg/L)				
		0-h	24h	48h	72h	96h	0-h	24h	48h	72h	96h	0-h	24h	48h	72h	96h	0-h	24h	48h	72h	96h	0-h	24h	48h	72h	96h
0	1	10	10	10	10	10	9.6	9.3	9.3	9.5	10.4	7.3				7.3	86				102	102				108
0	2	10	10	10	10	9	9.8	9.3	9.6	9.6	10.6															
5.6	3	10	10	10	10	10	9.2	9.2	9.2	9.2	10.3	7.1				6.4	81				99	102				150
5.6	4	10	10	10	10	9	9.1	9.3	9.8	9.0	10.2															
10.0	5	10	10	10	9	9	9.0	9.1	9.8	9.9	11.4	7.0				6.0	79				65	102				158
10.0	6	10	10	10	9	9	9.0	9.0	9.7	9.8	10.3															
18.0	7	10	10	10	8	7	8.9	9.1	9.6	9.6	11.0	6.9				5.8	74				75	116				184
18.0	8	10	10	9	7	7	8.9	9.0	9.4	9.4	10.8															
32.0	9	10	10	8	7	5	8.7	8.9	9.4	10.2	9.6	6.7				6.9	69				78	124				182
32.0	10	10	9	7	6	5	8.7	8.8	9.0	10.0	9.5															
56.0	11	10	8	6	5	3	8.3	8.7	9.1	9.8	9.2	6.4				6.2	49				43	154				238
56.0	12	10	9	7	5	4	8.4	8.5	9.7	9.4	9.0															
75.0	13	10	6	5	3	2	8.2	8.3	8.4	8.7	9.0	6.2				6.3	27				21	172				251
75.0	14	10	7	5	2	1	8.1	8.1	8.5	8.8	9.2															
100.0	15	10	4	3	0	0	7.8	8.3	9.8	9.4	9.2	6.0				6.5	18				13	200				264
100.0	16	10	5	3	0	0	7.9	8.5	9.1	9.6	8.4															

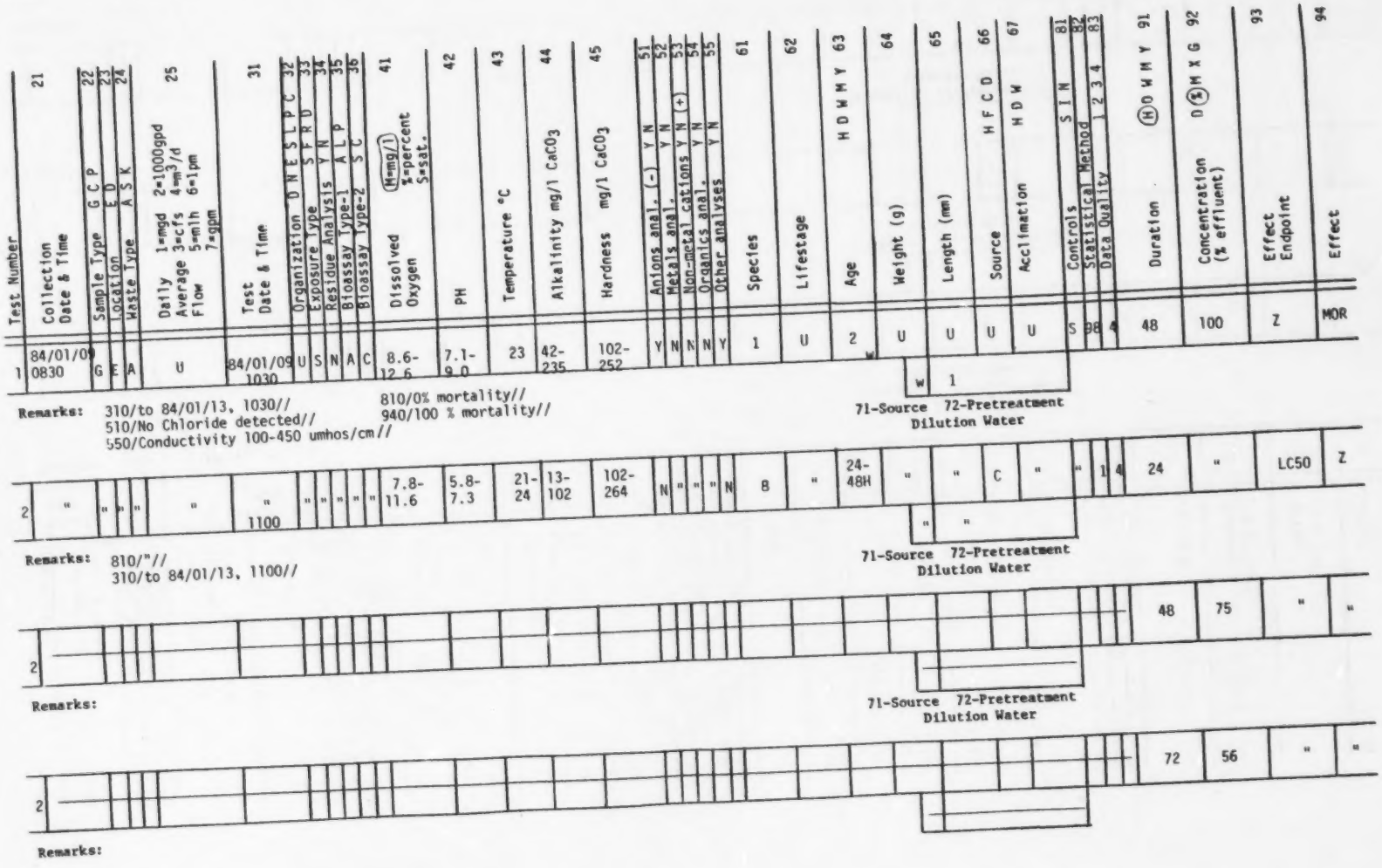
Comments: Test temperature 21-24°C
LC50's determined by Log-Concentration vs. Percent Survival graphical interpolation.
24 H LC50 = 100.0% 72 H LC50 = 56.0%
48 H LC50 = 75.0% 96 H LC50 = 32.0%

COMPLEX EFFLUENT TOXICITY INFORMATION SYSTEM

DATA RECORD FORM

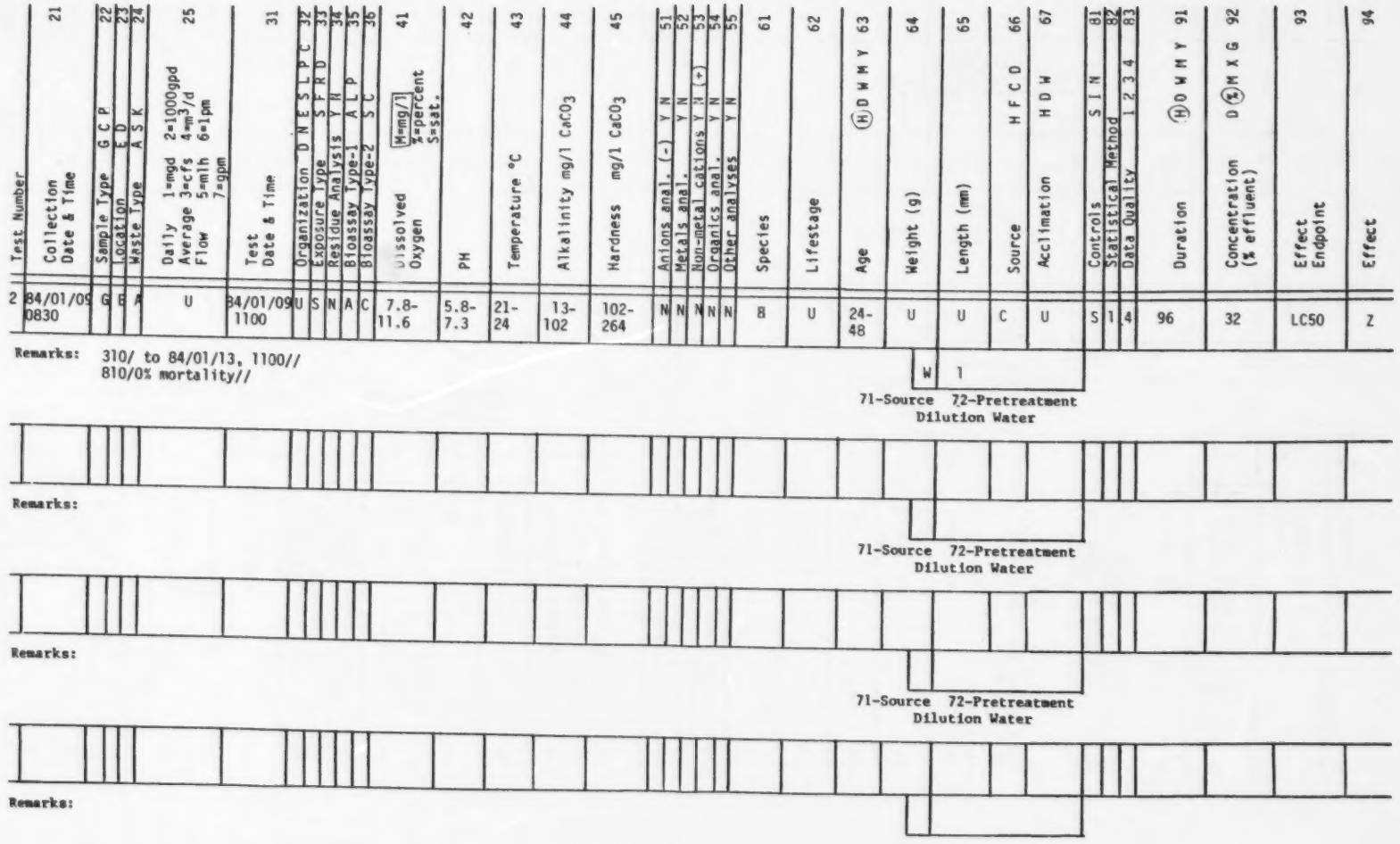
1)	Reference Number	MNED00600000
2)	NPDES Number of Direct Discharger (Receiving Facility)	MN0000000
3)	Indirect Source (Y/N) / Indirect Source Number	N Z
4)	Indirect Facility Name	Z
5)	Direct Discharger Facility Name & Type	Facility Name
6)	Address	Street Number
	City ..... County	Your Town 00
	State or Province (2 char code) / Zip or Country	MN 55812
7)	Direct Discharger Facility SIC Codes (5 4-digit codes)	4952 -1 -1 -1 -1
	Indirect SIC Codes (2 4-digit codes)	-1 -1
11)	Direct Discharger NPDES Outfall Pipe Number	001
	Indirect Discharger Pipe Number	-1
12)	Effluent Treatment (7 2-char. codes)	AA U U U U U U
14)	Disposal (Surface water, Other)	S
15)	Discharge Type (Process, Cooling, Both, Other)	P
	Indirect Discharge Type	Z
16)	Discharge SIC Codes (5 4-digit codes)	-1 -1 -1 -1 -1
17)	Receiving Water Name	Cedar Creek
	Receiving Water Major Basin / Minor Basin	00 00
18)	Receiving Water Reach Number	-1
19)	Receiving Water Mean Annual Flow (cfs) / Low Flow (cfs)	500.00 2.0
	Coder Name (last name, initials) / Coding Date YY/MM/DD	Crane, JL 84/01/16

Data Record Forms - (continued)



Test Number	21	Collection Date & Time	22 Sample Type G C P	23 Location E D	24 Waste Type A S K	25 Daily 1=mgd 2=1000gpd Average 3=cfs 4=m3/d Flow 5=mlh 6=lpm 7=gpm	31 Test Date & Time	32 Organization D N E S L P C	33 Exposure Type S F R D	34 Residue Analysis Y N	35 Bioassay Type-1 A L P	36 Bioassay Type-2 S C	41 Dissolved Oxygen (M=mg/l) %=percent S=sat.	42 PH	43 Temperature °C	44 Alkalinity mg/l $CaCO_3$	45 Hardness mg/l $CaCO_3$	51 Anions anal. (-) Y N	52 Metals anal. Y N	53 Non-metal cations Y N (+)	54 Organics anal. Y N	55 Other analyses Y N	61 Species	62 Lifestage	63 Age H D W M Y	64 Weight (g)	65 Length (mm)	66 Source H F C D	67 Acclimation H D W	81 Controls S I N	82 Statistical Method 1 2 3 4	83 Data Quality	91 Duration (H)O W M Y	92 Concentration D(%)M X G	93 Effect Endpoint	94 Effect
1		84/01/09 0830	G	E	A	U	84/01/09 1030	U	S	N	A	C	8.6-12.6	7.1-9.0	23	42-235	102-252	Y	N	N	N	Y	1	U	2 W	U	U	U	U	S	98	4	48	100	Z	MOR
																										w	1									
Remarks:		310/to 84/01/13, 1030// 510/No Chloride detected// 550/Conductivity 100-450 umhos/cm//											810/0% mortality// 940/100 % mortality//																							
71-Source 72-Pretreatment Dilution Water																																				
2	"	"	"	"	"	"	1100	"	"	"	"	"	7.8-11.6	5.8-7.3	21-24	13-102	102-264	N	"	"	"	N	8	"	24-48H	"	"	C	"	"	1	4	24	"	LC50	Z
																										"	"									
Remarks:		810/"// 310/to 84/01/13, 1100//																																			
71-Source 72-Pretreatment Dilution Water																																				
2																																	48	75	"	"
Remarks:																																				
71-Source 72-Pretreatment Dilution Water																																				
2																																	72	56	"	"
Remarks:																																				

Data Record Forms - (continued)


Test Number
Collection Date & Time 21
Sample Type G C P 22
Location E D 23
Waste Type A S K 24
Daily 1=mgd 2=1000gpd
Average 3=cfs 4=m3/d 25
Flow 5=mlh 6=lpm 7=gpm
Test Date & Time 31
Organization D N E S L P C 32
Exposure Type S F R D 33
Residue Analysis Y N 34
Bioassay Type-1 A L P 35
Bioassay Type-2 S C 36
Dissolved Oxygen M=mg/l %=percent S=sat. 41
PH 42
Temperature °C 43
Alkalinity mg/l CaCO3 44
Hardness mg/l CaCO3 45
Anions anal. (-) Y N 51
Metals anal. Y N 52
Non-metal cations Y N (+) 53
Organics anal. Y N 54
Other analyses Y N 55
Species 61
Lifestage 62
Age (H) D W M Y 63
Weight (g) 64
Length (mm) 65
Source H F C D 66
Acclimation H D W 67
Controls S I N 81
Statistical Method 82
Data Quality 1 2 3 4 83
Duration (H) D W M Y 91
Concentration (% effluent) D (%) M X G 92
Effect Endpoint 93
Effect 94
2 84/01/09 0830 G B A U 84/01/09 1100 U S N A C 7.8-11.6 5.8-7.3 21-24 13-102 102-264 N N N N N 8 U 24-48 U U C U S 1 4 96 32 LC50 Z
Remarks: 310/ to 84/01/13, 1100//
810/0% mortality//
W 1
71-Source 72-Pretreatment
Dilution Water
Remarks:
71-Source 72-Pretreatment
Dilution Water
Remarks:
71-Source 72-Pretreatment
Dilution Water
Remarks:

Appendix I

COMMON WATER AND WASTEWATER CONSTITUENTS

Anions

Br^-	- bromide	I^-	- iodide
Cl^-	- chloride	NO_3^-	- nitrate
CN^-	- cyanide	NO_2^-	- nitrite
CNO^-	- cyanates	PO_4^{3-}	- phosphate
CNS^-	- thiocyanate	SO_4^{2-}	- sulfate
$CO_3^=$	- carbonate	SO_3^{2-}	- sulfite
F^-	- fluoride	S^{2-}	- sulfide
HCO_3^-	- bicarbonate		

Metals

Ag	- silver	Mg	- magnesium
Al	- aluminum	Mn	- manganese
As	- arsenic	Mo	- molybdenum
Au	- gold	Na	- sodium
Ba	- barium	Ni	- nickel
Be	- beryllium	Os	- osmium
Bi	- bismuth	Pb	- lead
Ca	- calcium	Pt	- platinum
Cd	- cadmium	Rh	- rhodium
Co	- cobalt	Ru	- ruthenium
Cr	- chromium	Sb	- antimony
Cs	- cesium	Se	- selenium
Cu	- copper	Si	- silicon
Fe	- iron	Sn	- tin
Hg	- mercury	Sr	- strontium
Ir	- iridium	Ti	- titanium
K	- potassium	V	- vanadium
Li	- lithium	Zn	- zinc

[1] Standard Methods for the Examination of Water and Wastewater, 15 ed. 1981. Am. Public Health Assn., New York. 1134 p.

Nonmetal Cations

NH_4^+ - ammonium

B^{+3} - boron

Organics

Biochemical Oxygen Demand (BOD)
Carbon - Chloroform Extract (CCE-M)
Chemical Oxygen Demand (COD)
Halogenated Methanes and Ethanes
Methane (CH_4)
Nitrogen (organic)
Oil and Grease
Organic Acids and Volatile Acids
Pesticides (organic)
Phenols
Surfactants (anionic)
Tannin and Lignin
Total Organic Carbon (TOC)

Other Analyses

Ammonia-Nitrogen (NH_3-N)
Calcium Carbonate ($CaCO_3$) Saturation
Chlorine (Cl_2)
Chlorine Dioxide (ClO_2)
Color
Conductivity
Floatables
Fluorine (F_2)
Iodine (I_2)
Kjeldahl Nitrogen (organic N + NH_3)
Odor
Phosphorus (total)
Residual Chlorine (Cl_2)
Residual Ozone (O_3)
Residues (solids)
Silica Dioxide (SiO_2)
Sulfide (total)
Turbidity

Appendix J

SPECIES CODES

CETIS

List of species that are being used in CETIS as of July, 1984. The list is sorted numerically by species number. Updated or alternatively sorted lists are available on request from the CETIS Coordinator.

Species No.	Latin Name	Common Name
1	PIMEPHALES PROMELAS	FATHEAD MINNOW
2	LEPOMIS MACROCHIRUS	BLUEGILL
3	SALVELINUS FONTINALIS	BROOK TROUT
4	SALMO GAIRDNERI	RAINBOW TROUT, DONALDSON TROUT
5	DAPHNIA MAGNA	WATER FLEA
6	GAMMARUS LACUSTRIS	SCUD
7	GAMMARUS FASCIATUS	SCUD
8	DAPHNIA PULEX	WATER FLEA
10	CARCINUS MAENAS	SHORE OR GREEN CRAB
11	CRANGON CRANGON	COMMON SHRIMP
16	GAMBUSIA AFFINIS	MOSQUITOFISH
18	SEMOTILUS ATROMACULATUS	CREEK CHUB
19	LAGODON RHOMBOIDES	PINFISH
20	ICTALURUS PUNCTATUS	CHANNEL CATFISH
21	CYPRINUS CARPIO	COMMON, MIRROR, COLORED, CARP
22	ONCORHYNCHUS TSHAWYTSCHA	CHINOOK SALMON
23	ONCORHYNCHUS KISUTCH	COHO SALMON
25	CARASSIUS AURATUS	GOLDFISH
27	GAMMARUS PSEUDOLIMNAEUS	SCUD
28	POECILIA RETICULATA	GUPPY
30	LEPOMIS CYANELLUS	GREEN SUNFISH
33	FISH	FISH
38	PERCA FLAVESCENS	YELLOW PERCH
39	PALAEMONETES KADIAKENSIS	GRASS SHRIMP, FRESHWATER PRAWN
49	SALMO TRUTTA	BROWN TROUT
52	HYALELLA AZTECA	SCUD
54	SIMOCEPHALUS SERRULATUS	WATER FLEA
56	ASTERIAS RUBENS	STARFISH
67	CRASSOSTREA VIRGINICA	AMERICAN OR VIRGINIA OYSTER
68	SALMO SALAR	ATLANTIC SALMON
69	LABIDESTHES SICCULUS	BROOK SILVERSIDE
70	DAPHNIA SP	WATER FLEA
74	PENAEUS AZTECUS	BROWN SHRIMP
75	PENAEUS DUORARUM	PINK SHRIMP
77	PENAEUS SETIFERUS	WHITE SHRIMP (AMERICA)
82	SALVELINUS NAMAYCUSH	LAKE TROUT, SISCOWET
83	STIZOSTEDION VITREUM VITREUM	WALLEYE

Species No.	Latin Name	Common Name
85	CHIRONOMUS TENTANS	MIDGE
86	CYPRINODON VARIEGATUS	SHEEPSHEAD MINNOW
89	MICROPTERUS SALMOIDES	LARGEMOUTH BASS
90	ONCORHYNCHUS NERKA	SOCKEYE SALMON
94	BARBUS TICTO	TWO SPOTTED, TIC TAC TOE BARB
96	LEPOMIS MICROLOPHUS	REDEAR SUNFISH
102	PROCAMBARUS CLARKII	RED SWAMP CRAYFISH
105	UMBRA PYGMAEA	EASTERN MUDMINNOW
106	MICROPTERUS DOLOMIEUI	SMALLMOUTH BASS
110	LEIOSTOMUS XANTHURUS	SPOT
112	NOTEMIGONUS CRYSOLEUCAS	GOLDEN SHINER
113	CLARIAS BATRACHUS	WALKING CATFISH
133	ICTALURUS MELAS	BLACK BULLHEAD
140	CYMATOGASTER AGGREGATA	SHINER PERCH
142	MYSIDOPSIS BAHIA	OPOSSUM SHRIMP
202	LABEO ROHITA	ROHU
205	OSCILLATORIA LIMNETICA	BLUE-GREEN ALGAE
208	MYTILUS EDULIS	COMMON BAY MUSSEL, BLUE MUSSEL
211	ALBURNUS ALBURNUS	BLEAK
219	ONCORHYNCHUS GORBUSCHA	PINK SALMON
224	NEREIS ARENACEODENTATA	POLYCHAETE
235	CAMPELOMA DECISUM	BROWN MYSTERY SNAIL
239	PHYSA INTEGRA	POUCH SNAIL
263	COREGONUS CLUPEAFORMIS	LAKE WHITEFISH
283	CATOSTOMUS COMMERSONI	WHITE SUCKER
285	ICTALURUS NEBULOSUS	BROWN BULLHEAD
288	CULAEA INCONSTANS	BROOK STICKLEBACK
290	LEPOMIS MEGALOTIS	LONGEAR SUNFISH
293	ETHEOSTOMA SPECTABILE	ORANGETHROAT DARTER
302	PALAEMONETES PUGIO	GRASS SHRIMP, FRESHWATER PRAWN
308	MYSTUS VITTATUS	CATFISH
309	SKELETONEMA COSTATUM	DIATOM
346	HOMARUS AMERICANUS	AMERICAN LOBSTER
352	HETEROPNEUSTES FOSSILUS	INDIAN CATFISH
361	ORCONECTES VIRILIS	CRAYFISH
366	ARTEMIA SALINA	BRINE SHRIMP
371	CYPRINODONTIDAE	KILLIFISH, TOPMINNOW FAMILY
375	MENIDIA MENIDIA	ATLANTIC SILVERSIDE
376	ACARTIA TONSA	CALANOID COPEPOD
407	NOTOPTERUS NOTOPTERUS	FEATHERBACK
418	CHANNA PUNCTATUS	SNAKE-HEAD CATFISH
422	CIRRHINUS MRIGALA	CARP, HAWKFISH
423	BREVOORTIA TYRANNUS	ATLANTIC MENHADEN
436	BOWMANIELLA DISSIMILIS	MYSID, OPOSSUM SHRIMP
466	NOTROPIS CORNUTUS	COMMON SHINER

Species No.	Latin Name	Common Name
482	ALGAE	ALGAE, PHYTOPLANKTON, ALGAL MAT
483	CHAOBORUS PUNCTIPENNIS	PHANTOM MIDGE
486	SELENASTRUM CAPRICORNUTUM	GREEN ALGAE
488	INVERTEBRATES	INVERTEBRATES
508	CERATOPHYLLUM DEMERSUM	COON-TAIL
522	RANGIA CUNEATA	COMMON RANGIA OR CLAM
540	HYDROPSYCHE SP	CADDISFLY
549	HIPPOLYTE SP	SHRIMP OR PRAWN
572	CATLA CATLA	CATLA
574	ANGUILLA ANGUILLA	COMMON EEL
575	CRASSOSTREA GIGAS	PACIFIC OYSTER
578	ALOSA AESTIVALIS	BLUEBACK HERRING
602	ORCONECTES PROPINQUUS	CRAYFISH
639	OPHIOCEPHALUS PUNCTATUS	SNAKEHEAD
677	PTERONARCYS SP	STONEFLY
713	MYSTUS SEENGHALA	CATFISH
736	ONCORHYNCHUS KETA	CHUM SALMON
892	ICTALURUS NATALIS	YELLOW BULLHEAD
894	CLUPEA HARENGUS PALLASI	PACIFIC HERRING
964	CHIRONOMUS RIPARIUS	MIDGE
970	AMBYSTOMA OPACUM	MARBLED SALAMANDER
988	BUCCINUM UNDATUM	LARGE WHELK
1022	CTENODRILUS SERRATUS	POLYCHAETE
1074	NOTROPIS HETEROLEPIS	BLACKNOSE SHINER
1132	NOTROPIS ANOGENUS	PUGNOSE SHINER
1133	NOTROPIS EMILIAE	PUGNOSE MINNOW
1137	TUBIFEX SP	TUBIFICID WORM
1140	CENTRARCHIDAE	SUNFISH FAMILY
1178	PAROPHRYS VETULUS	ENGLISH SOLE
1186	BRANCHIURA SOWERBYI	OLIGOCHAETE
1295	MYSIDOPSIS ALMYRA	OPOSSUM SHRIMP
1321	DAPHNIA SCHODLERI	WATER FLEA
1329	HEMIGRAPSUS SP	SHORE CRAB
1369	BALANUS GLANDULA	ROCK BARNACLE
1407	LEMNA SP	DUCKWEED
1527	HETERANDRIA FORMOSA	LEAST KILLIFISH
1570	OPHRYTROCHA LABRONICA	POLYCHAETE
1584	BARBUS SOPHORE	TWO SPOTTED BARB, DOTTED BARB
1585	CHANNA MARULIUS	SNAKE-HEAD CATFISH
1586	ANISOGAMMARUS PUGETTENSIS	SCUD
1587	LEPOMIS SP	SUNFISH
1593	LEMNA PERPUSILLA	DUCKWEED
1619	POMOXIS SP	CRAPPIE
1620	HELIODIAPTOMUS VIDUUS	CALANOID COPEPOD
1738	NOTROPIS PERCOBROMUS	FISH

Species No.	Latin Name	Common Name
1739	NOTROPIS ZONATUS	BLEEDING SHINER
1905	MACROBRACHIUM KISTNENSIS	SHRIMP
1984	MYSIDACEA	MYSID OR OPOSSUM SHRIMP ORDER
1990	HYBOGNATHUS PLACITUS	PLAINS MINNOW
1991	GLYPTOTENDIPES SP	MIDGE
2052	MERCENARIA CAMPECHIENSIS	SOUTHERN QUAHOG
2053	DONAX VARIABILIS TEXASIANA	COQUINA
2054	DINOPHILUS SP	BRISTLE WORM
2065	PHOXINUS SP	DACE
2107	PAGURUS BERNHARDUS	HERMIT CRAB
2108	GAMMARUS DAIBERI	SCUD
2109	NEOMYSIS AMERICANA	OPOSSUM SHRIMP
2123	ONCHIDORIS FUSCA	SEA SLUG, NUDIBRANCH
2124	CANCER PAGURUS	EDIBLE OR ROCK CRAB
2143	MENIDIA PENINSULAE	TIDEWATER SILVERSIDE
2190	MUDFISH	MUDFISH
2191	SALVELINUS ALPINUS	ARCTIC CHAR
2203	PSAMMECHINUS MILIARIS	SEA URCHIN

Appendix K

PUBLISHED METHODS FOR CONDUCTING EFFLUENT BIOASSAYS

Peltier, W. 1978. Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms. Environ. Monitoring and Support Lab., EPA-600/4-78-012, Office of Res. and Develop., U.S. Environ. Prot. Agency, Cincinnati, OH: 52 p.

Peltier, W. and C. I. Weber. 1984 (Draft). Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms. Environ. Monitoring and Support Lab., EPA-600/4-82-000, Office of Res. and Develop., U.S. Environ. Prot. Agency, Cincinnati, OH: 200 p.

Standard Methods for the Examination of Water and Wastewater, 15 ed. 1981. Am. Public Health Assn., New York. 1134 p.

Standard Practice for Conducting Acute Toxicity Tests with Fishes, Macroinvertebrates, and Amphibians. 1980. pp. 1-25 in Annual Book of ASTM Standards.

United States Environmental Protection Agency. 1971. Algal Assay Procedure Bottle Test. Nat. Eutrophication Res. Pro. 82 p.

Weber, C. I. and W. Peltier. 1981 (Draft). Effluent Toxicity Screening Test Using Daphnia and Mysid Shrimp. Environ. Monitoring and Support Lab., EPA-600/4-81-000, Office of Res. and Develop., U.S. Environ. Prot. Agency, Cincinnati, OH: 44 p.

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